

Weekly Discovery

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7 Jul - 11 Jul 2025

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AI
[AI Cameras Change Driver Behavior at Intersections Unblinking eyes could lower the vehicular death toll](#)

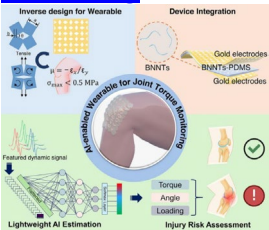


"In cities across the United States, an ambitious goal is gaining traction: Vision Zero, the strategy to eliminate all traffic fatalities and severe injuries. First implemented in Sweden in the 1990s, Vision Zero has already cut road deaths there by 50 percent from 2010 levels. Now, technology companies like Stop for Kids and Obvio.ai are trying to bring the results seen in Europe to U.S. streets with AI-powered camera systems designed to keep drivers honest, even when police aren't around.

Local governments are turning to AI-powered cameras to monitor intersections and catch drivers who see stop signs as mere suggestions. The stakes are high: About half of all car accidents happen at intersections, and too many end in tragedy. By automating enforcement of rules against rolling stops, speeding, and failure to yield, these systems aim to change driver behavior for good. The carrot is safer roads and lower insurance rates; the stick is citations for those who break the law."

Source: [IEEE Spectrum](#) (5 Jul 2025)

AI
[AI-enabled piezoelectric wearable for joint torque monitoring: A breakthrough in joint health monitoring](#)



"In the pursuit of more effective and accessible solutions for joint health monitoring, researchers are constantly seeking innovative ways to enhance the capabilities of wearable devices. A recent article published in Nano-Micro Letters, authored by Professor Jin-Chong Tan and Professor Hubin Zhao from the University of Oxford and University College London, presents a groundbreaking AI-enabled piezoelectric wearable device for accurate joint torque sensing, leveraging the unique properties of boron nitride nanotubes (BNNTs).

Why This Research Matters

Enhanced Joint Health Monitoring: Traditional methods for assessing joint torque are often confined to laboratory settings or require complex setups, limiting their feasibility for real-world applications. This new wearable device offers a portable, non-invasive solution for continuous joint torque monitoring, crucial for evaluating joint health, guiding interventions, and monitoring rehabilitation progress.

High Sensitivity and Accuracy: The device's high-sensitivity BNNTs/polydimethylsiloxane composite enables precise and dynamic knee motion signal detection, while the lightweight neural network processes complex signals for accurate torque, angle, and load estimation, providing reliable data for joint health assessment.

Low-Cost and Accessible Solution: The compatibility of the materials and design with low-power, resource-limited settings makes this wearable device a cost-effective and accessible solution for diverse populations across regions with varying levels of development, potentially revolutionizing joint health monitoring on a global scale."

Source: [IEEE Spectrum](#) (7 Jul 2025)



Featured Course
Python Data Analysis
3h 43m
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AGING
[Scientists just found a sugar switch that protects your brain from Alzheimer's](#)



"Scientists have uncovered a surprising sugar-related mechanism inside brain cells that could transform how we fight Alzheimer's and other dementias. It turns out neurons don't just store sugar for fuel—they reroute it to power antioxidant defenses, but only if an enzyme called GlyP is active. When this sugar-clearing system is blocked, toxic tau protein builds up and accelerates brain degeneration."

Source: [BI for Research on Aging](#) (7 Jul 2025)

ARCHITECTURE
[Hong Kong's Queensway Reimagined: Sara Klomps on the Genesis and Ambition of The Henderson by Zaha Hadid Architects](#)

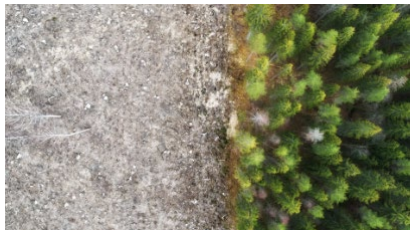


"Architectural landmarks often cluster together. In Tokyo, the iconic Omotesando is a well-known stretch where global "starchitects" built flagship luxury retail spaces in the 2000s. Hong Kong has a lesser-known but equally powerful architectural agglomeration along Queensway—though historically more corporate and less publicly engaging. Beginning in the 1980s, this corridor became home to a series of landmark buildings by some of the world's most prominent architects: Norman Foster's HSBC Headquarters, I.M. Pei's Bank of China Tower, Paul Rudolph's Lippo Centre, and the nearby Murray Building by Ron Phillips—now revitalized as a hotel by Foster + Partners. The area is further enriched later on by Heatherwick Studio's renovation of Pacific Place and Tod Williams Billie Tsien Architects' Asia Society Hong Kong Center.

For decades, Queensway remained largely defined by these monumental contributions. But recently, a new presence has emerged: *The Henderson* by [Zaha Hadid Architects](#). Sculptural, luminous, and technologically daring, the tower not only refreshes the Hong Kong skyline—it redefines how commercial architecture can engage with the city. Where [Norman Foster](#) once reimagined the ground plane with the open base of the HSBC building, *The Henderson* offers a contemporary response: elevating the public realm both figuratively and literally through a raised lobby and a public bridge that weaves into the city's pedestrian network."

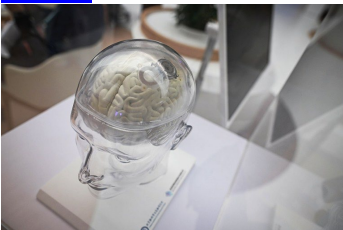
Source: [Archdaily](#) (7 Jul 2025)

ARCHITECTURE
[Climate is changing fast—and forests are 200 years behind](#)



"Forests aren't keeping up with today's climate chaos. While temperatures soar within decades, tree populations take 100 to 200 years to shift in response. A sweeping new analysis of ancient pollen and modern data reveals this dramatic lag—and its consequences. As ecosystems fall out of sync with their environments, scientists warn that without help, many forests could wither or collapse."

BRAIN CHIPS
[China pours money into brain chips that give paralysed people more control](#)



"A deep-brain device that allowed a man with no limbs to play computer games is one of an increasing number of brain-computer interfaces (BCI) being trialled in people in China.

The BCI system, developed by medical-technology company StairMed in Shanghai, China, is similar to the implants being trialled in people by Neuralink, owned by Elon Musk, based in Fremont, California. StairMed's device has fewer probes than Neuralink's device has, but it is smaller and less invasive.

Compared with the United States, China doesn't have the long history in the field, and many of the devices being trialled there are simplified versions of those developed by US companies, say researchers. But "BCI research in China is developing very fast," says Zhengwu Liu, an electrical engineer at the University of Hong Kong.

Researchers in China are advancing the field on several fronts, such as by improving algorithms used to decode neural data and the implantation devices, says Christian Herff, a neural engineer at Maastricht University in the Netherlands, who co-organized a meeting on BCI in Shanghai last year.

The Chinese government has identified brain-computer systems as a priority area of innovation, and funding agencies are pouring money into the field. "A lot of young scientists are involved in this new wave of BCI" in China and have industry ties, says Yuaning Li, a computational neuroscientist at ShanghaiTech University.

The country also has the medical infrastructure and population to test and validate technologies, says Li. "Progress made here can

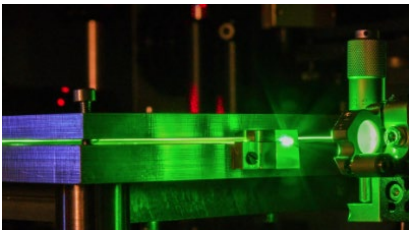
DESIGN
[Eight tennis venues that serve eye-catching design on and off the court](#)



"With the Wimbledon Championships underway, we take a look at striking tennis courts at clubhouses and sports venues from around the world that have been featured on Dezeen.

From a rammed-earth sports complex in Mexico to a floating tennis court on Australia's Great Barrier Reef, we've collected tennis courts with eye-catching designs for you to pore over while enjoying strawberries and cream during the Wimbledon tennis tournament."

OPTICS
[Scientists capture real-time birth of ultrafast laser pulses](#)



"Scientists have captured the moment a laser "comes to life"—and what they found challenges long-held beliefs. Using a special technique to film laser light in real time, researchers observed how multiple pulses grow and organize themselves into a stable rhythm. Instead of one pulse splitting into many (as previously thought), these pulses are amplified and evolve through five fast-paced phases, from initial chaos to perfect synchronization. This discovery not only deepens our understanding of how lasers work but could also lead to sharper, faster technologies in communication, measurement, and manufacturing."

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| <p>Source: Syracuse University (4 Jul 2025)</p> | <p>benefit patients and researchers worldwide," he says.</p> <p>Several teams have announced initial results for early-stage trials, but none of these has been peer reviewed."</p> <p>Source: Nature (4 Jul 2025)</p> | <p>Source: Dezeen (5 Jul 2025)</p> | <p>Source: IEEE (6 Jul 2025)</p> |
| <p>QUANTUM COMPUTERS</p> <p>Quantum computers just beat classical ones — Exponentially and unconditionally</p>  <p>"A research team has achieved the holy grail of quantum computing: an exponential speedup that's unconditional. By using clever error correction and IBM's powerful 127-qubit processors, they tackled a variation of Simon's problem, showing quantum machines are now breaking free from classical limitations, for real."</p> <p>Source: USC (30 Jun 2025)</p> | <p>QUANTUM COMPUTING</p> <p>Scientists just simulated the "impossible" — fault-tolerant quantum code cracked at last</p>  <p>"A multinational team has cracked a long-standing barrier to reliable quantum computing by inventing an algorithm that lets ordinary computers faithfully mimic a fault-tolerant quantum circuit built on the notoriously tricky GKP bosonic code, promising a crucial test-bed for future quantum hardware."</p> <p>Source: EurekAlert! (7 Jul 2025)</p> | <p>URBAN PLANNING</p> <p>A new perspective on designing urban low-altitude logistics networks subhead: Balancing cost, safety, and noise through co-evolutionary multi-objective optimization</p>  <p>"As cities worldwide begin embracing low-altitude logistics to support rapid, flexible deliveries by drones, urban planners face an increasingly difficult challenge: how to design an aerial delivery network that balances cost efficiency, safety, and noise impact.</p> <p>A research team from Beihang University has developed a new framework that tackles this challenge head-on. Their study presents a multi-layered, hub-and-spoke logistics network design optimized using a dual-population co-evolutionary algorithm. This method not only improves route planning and facility placement but also explicitly accounts for noise constraints — a key concern for residents living near hospitals, schools, and housing complexes.</p> <p>The team published their work in Acta Aeronautica et Astronautica Sinica on March 12, 2025.</p> <p>"Noise is often the neglected factor in low-altitude logistics," said Dr. Yumeng Li, the corresponding author and associate professor at Beihang University. "But as drone delivery scales up, the public's tolerance for frequent overflights will be tested. Our approach takes noise considerations into the core of the logistics network's design."</p> <p>A key innovation is the adoption of a multi-layered hub-and-spoke network structure, where nodes (takeoff/landing points and delivery centers) are mapped onto different altitude levels, and links represent horizontal drone flight paths. The model incorporates population-density-based risk zoning and classifies noise-sensitive facilities such as residential areas as constraints."</p> <p>Source: EurekAlert! (7 Jul 2025)</p> | <p>VR</p> <p>Virtual forest bathing alleviates stress</p>  <p>"A team of researchers from the Max Planck Institute for Human Development (MPIB) and the University Medical Center Hamburg-Eppendorf (UKE) has demonstrated in a recent pilot study that virtual forest bathing can improve emotional well-being – especially if the virtual natural environment appeals to multiple senses, such as hearing, sight and smell, at once. The results have now been published in the Journal of Environmental Psychology."</p> <p>Source: MPID (2 Jul 2025)</p> |