

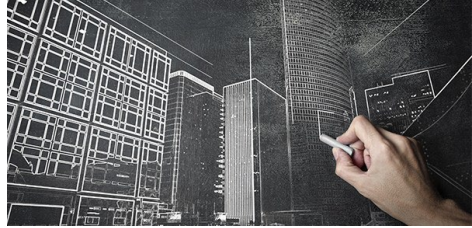
Weekly Discovery

We SHARE to inspire and ignite ideas!

3 - 7 April 2023

ARCHITECTURE

What really matters in multi-storey building design?



"The impact of multi-storey building design considerations on embodied emissions, cost, and operational energy has been revealed for the first time. Using a model, researchers estimate that 28 - 44% of yearly heating and cooling energy, and six gigatonnes of cumulative embodied carbon dioxide equivalent from now until 2050, could be saved in new multi-storey buildings by employing certain recommendations and using technology available today."

Source: [Cambridge](#) (22 March 2023)

ARTIFICIAL INTELLIGENCE

Will AI Replace Computer Programmers?



"AI-powered coding assistants like OpenAI's model, GitHub Copilot, and Replit Ghostwriter are changing how computer programmers do their jobs. That's because, thanks to advancements in the large language models that power them, these tools can now, in some instances, automatically generate reliable code."

Source: [ACM](#) (30 March 2023)

AVIATION

Aviation, the Unlikely Road to Long-range EVs



"... Several carmakers and battery startups are looking at silicon anodes for the next generation of long-range, lightweight EV batteries."

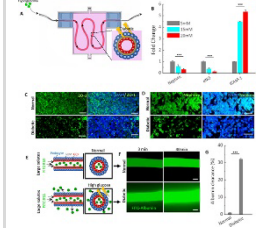
And now Amprius Technologies, in Fremont, Calif., reports a silicon-anode battery with almost twice the energy density of most EV batteries today. The new battery's record-high 500 watt-hours per kilogram energy density was verified by Mobile Power Solutions, an independent test and verification lab in Beaverton, Ore.

"Typical batteries used by Tesla and others are in the 250- to 300-Wh/kg range," says Ionel Stefan, CTO of Amprius. "With our cells, you will have double the driving range for the same vehicle weight. Or you could keep the same range and have a lighter battery so the mileage efficiency of the car increases."

Source: [IEEE](#) (31 March 2023)

BIOFABRICATION

Development of an Artificial Kidney for Early Detection of Drug Toxicity

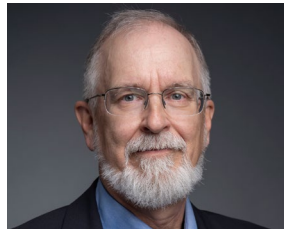


"The kidney plays a vital role in maintaining homeostasis within the body by eliminating toxic and superfluous substances in the bloodstream, including waste generated during metabolic processes, through urine. Nevertheless, toxicity can also be induced in the kidney from certain medications. Recently, a research team from POSTECH has engineered an artificial kidney that allows for the early detection of adverse drug reactions."

Source: [EurekaAlert](#) (30 March 2023)

EV

The Staggering Scale of the EV Transition



"Throughout his research and reporting, Bob focused on the EV transition "at scale": What needs to happen for electric vehicles to displace internal-combustion-engine vehicles and have a measurable impact on climate change by mid-century? Quite a lot, it turns out. Humans must change two foundational sectors of modern civilisation—energy and transportation—to achieve the targeted reductions in greenhouse gas emissions. These simultaneous global overhauls will involve trillions of dollars in investments, tens of millions of workers, millions of new EVs, tens of thousands of kilometres of new transmission lines to carry electricity from countless new wind and solar farms, and dozens of new battery plants and new mines to feed them. Then there are the lifestyle compromises that most people living in developed countries will have to make."

Source: [IEEE](#) (31 March 2023)

HEALTHCARE

Retinal scans: A non-invasive, inexpensive method to track human aging



"Buck Institute professor Pankaj Kapahi thinks the eye is a window to aging. His lab, in collaboration with Google Research and Zuckerberg San Francisco General Hospital, has shown how imaging of the fundus, the blood vessel-rich tissue in the retina, can be used to track human aging, in a way that is noninvasive, less expensive and more accurate than other aging clocks that are currently available. Publishing in eLife, researchers also did a genome-wide association study (GWAS) to establish the genetic basis for such a clock, which they call eyeAge."

Source: [BUCK](#) (28 March 2023)

METaverse

The Emergent Industrial Metaverse

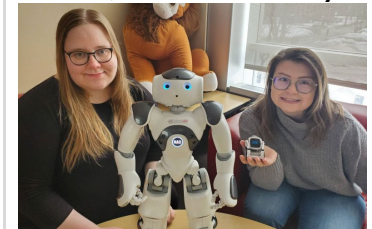


"The industrial metaverse will revolutionise the way work is done, but it will also unlock significant new value for business and societies. By allowing businesses to model, prototype, and test dozens, hundreds, or millions of design iterations in real time and in an immersive, physics-based environment before committing physical and human resources to a project, industrial metaverse tools will usher in a new era of solving real-world problems digitally."

Source: [MIT](#) (29 March 2023)

METaverse

Pre-schoolers prefer to learn from a competent robot than an incompetent human, Concordia study shows



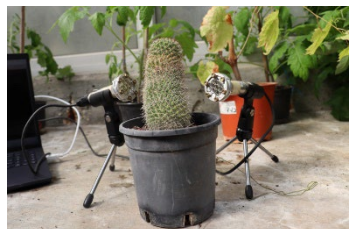
"Who do children prefer to learn from? Previous research has shown that even infants can identify the best informant. But would pre-schoolers prefer learning from a competent robot over an incompetent human?"

According to a new paper by Concordia researchers published in the Journal of Cognition and Development, the answer largely depends on age."

Source: [Concordia](#) (28 March 2023)

PHYTOACOUSTICS

Sounds Emitted by Plants Under Stress Are Airborne and Informative



"Global breakthrough: for the first time in the world, researchers at Tel Aviv University recorded and analysed sounds distinctly emitted by plants. The click-like sounds, similar to the popping of popcorn, are emitted at a volume similar to human speech, but at high frequencies, beyond the hearing range of the human ear. The researchers: "We found that plants usually emit sounds when they are under stress, and that each plant and each type of stress is associated with a specific identifiable sound. While imperceptible to the human ear, the sounds emitted by plants can probably be heard by various animals, such as bats, mice, and insects.""

Source: [ScienceDirect](#) (30 March 2023)

TEMPORARY INSTALLATIONS

Ashui Pavilion 2023 / MIA Design Studio



"The imagery of rivers is deeply intertwined with the history and urban development of Vietnam. The Saigon River is known as one of the largest rivers that bring great spiritual and economic value to the formation of Ho Chi Minh City. Every year, the Ashui Award takes place at a new location, where it is a place of exchange and honour for Vietnamese architects who have made positive contributions to the community."

Source: [ArchDaily](#) (2 April 2023)

SEMICONDUCTORS

Pulsing ultrasound waves could someday remove microplastics from waterways

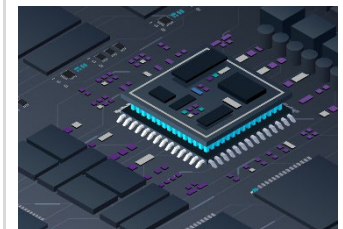


"Colorful particles of plastic drift along under the surface of most waterways, from headwater streams to the Arctic Ocean. These barely visible microplastics — less than 5 mm wide — are potentially harmful to aquatic animals and plants, as well as humans. So, researchers are devising ways to remove them and to stop them at their source. Today, a team reports a two-stage device made with steel tubes and pulsing sound waves that removes most of the plastic particles from real water samples."

Source: [ACS](#) (28 March 2023)

SEMICONDUCTORS

Multi-Die Systems Define the Future of Semiconductors



"A new semiconductor chip architecture, termed "multi-die system" or "chiplet-based design," will be instrumental in meeting this decade's burgeoning demand for processing power. Because this new approach will pose technical challenges throughout the semiconductor ecosystem—remaking how products are imagined, designed, and fabricated—opportunities for innovators across the value chain will emerge from this shift. Business leaders across industries who identify use cases for these advanced chips will benefit from their ability to power unique and customised customer experiences."

Source: [MIT](#) (31 March 2023)