Weekly Discovery
We SHARE to inspire and ignite ideas!

27 - 31 March 2023

ARCHITECTURE
The Orangery Renovation

"McCloy + Muchemwa has designed and renovated a dilapidated and asbestos-riddled garage in Norwich with self-build clients. The existing garage was dark, dusty, cluttered, and had issues with pests; making it virtually unusable as well as being visibly unattractive. With weekends-away and holidays cancelled during the Covid-19 pandemic pent-up energy was released onto the garden and into making the garage safer, functioning better, and be a more enjoyable space with generous and considered storage solutions."

Source: ArchDaily (26 March 2023)

ARTIFICIAL INTELLIGENCE
AI Rewrites Coding

"Enter artificial intelligence (AI). Over the last several years, various systems and frameworks have appeared that can automate code generation. For example, Amazon has developed CodeWhisperer, a coding assistant tool that automates coding in Python, Java, and JavaScript. GitHub's Copilot autogenerates code through natural language, and IBM's Project Wisdom is focused on building a framework that allows computers to program computers."

Source: ACM (April 2023)

ARTIFICIAL INTELLIGENCE
ChatGPT is about to revolutionize the economy. We need to decide what that looks like.
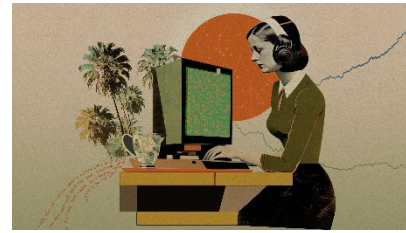
"Despite their limitations—chief among of them their propensity for making stuff up—ChatGPT and other recently released generative AI models hold the promise of automating all sorts of tasks that were previously thought to be solely in the realm of human creativity and reasoning, from writing to creating graphics to summarizing and analysing data. That has left economists unsure how jobs and overall productivity might be affected."

Source: MIT (25 March 2023)

ASSISTIVE DEVICES
Research Highlight: Head-Worn Assistive Teleoperation of Mobile Manipulators

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Source: CMU (7 March 2023)


AUTONOMOUS VEHICLES
Millimetre Wave Radar System Keeps Drivers Safe On The Road > This Startup's Sensor Checks Vital Signs To Detect Impaired Driving

"A new sensor could help reduce the number of accidents caused by impaired driving and could protect children left in hot cars. The Wireless Intelligent Sensing millimetre-wave radar system, developed by startup Pontosense, monitors vehicle occupants' vital signs, and it can detect the presence of passengers in the vehicle and where they are seated."

Source: IEEE (23 March 2023)

COMPUTER AIDED DESIGN
A Scoping Review of Voxel-Model Applications to Enable Multi-Domain Data Integration in Architectural Design and Urban Planning
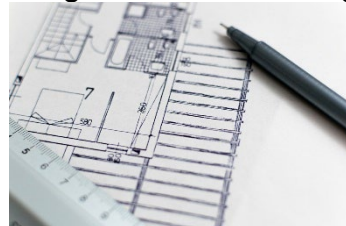
"Although voxel models have been applied to address diverse problems in computer-aided design processes, their role in multi-domain data integration in digital architecture and planning has not been extensively studied. The primary objective of this study is to map the current state of the art and to identify open questions concerning data structuring, integration, and modelling and design of multi-scale objects and systems in architecture. Focus is placed on types of voxel models that are linked with computer-aided design models."

Source: MDPI (23 March 2023)

CYBERSECURITY
Protecting AI Models from "Data Poisoning"

"Training data sets for deep-learning models involves billions of data samples, curated by crawling the Internet. Trust is an implicit part of the arrangement. And that trust appears increasingly threatened via a new kind of cyberattack called "data poisoning"—in which trawled data for deep-learning training is compromised with intentional malicious information. Now a team of computer scientists from ETH Zurich, Google, Nvidia, and Robust Intelligence have demonstrated two model data poisoning attacks. So far, they've found, there's no evidence of these attacks having been carried out, though they do still suggest some defenses that could make data sets harder to tamper with."

Source: IEEE (24 March 2023)

DRONES
Skywalker Takes to the Sky—and the Ground

"A new air-ground vehicle, appropriately named Skywalker, is able to seamlessly transition between ground and air modes, outperforming competing air-ground vehicles in several key performance measures. Skywalker was put to the test in a series of experiments, which were described in a study published 14 March in IEEE Robotics and Automation Letters."

Source: IEEE (26 March 2023)

ELECTRONICS
Researchers create breakthrough spintronics manufacturing process that could revolutionize the electronics industry
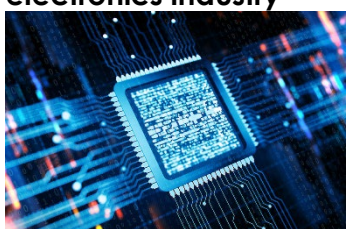

"University of Minnesota Twin Cities researchers, along with a team at the National Institute of Standards and Technology (NIST), have developed a breakthrough process for making spintronic devices that has the potential to become the new industry standard for semiconductors chips that make up computers, smartphones, and many other electronics. The new process will allow for faster, more efficient spintronics devices that can be scaled down smaller than ever before.

The researchers' paper is published in Advanced Functional Materials, a peer-reviewed, top-tier materials science journal. The researchers have also worked with University of Minnesota Technology Commercialization and NIST to patent this technology, along with several other patents related to this research."

Source: CSE (20 March 2023)

MATERIALS
Colourful Films Could Help Buildings, Cars Keep Their Cool
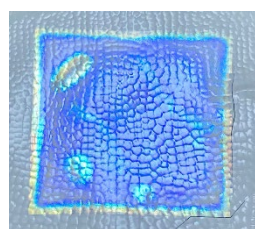
"Today, scientists report an eco-friendly alternative — a plant-based film that gets cooler when exposed to sunlight and comes in a variety of textures and bright, iridescent colours. The material could someday keep buildings, cars and other structures cool without requiring external power."

Source: EUREALERT (26 March 2023)


MATERIALS
Sculpting Quantum Materials For The Electronics Of The Future
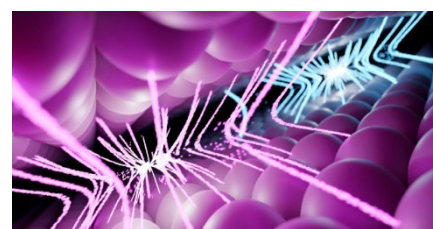
"The development of new information and communication technologies poses new challenges to scientists and industry. Designing new quantum materials - whose exceptional properties stem from quantum physics - is the most promising way to meet these challenges. An international team led by the University of Geneva (UNIGE) and including researchers from the universities of Salerno, Utrecht and Delft, has designed a material in which the dynamics of electrons can be controlled by curving the fabric of space in which they evolve. These properties are of interest for next-generation electronic devices, including the optoelectronics of the future. These results can be found in the journal Nature Materials.."

Source: UNIGE (20 March 2023)

RENEWABLES
We're the New Renewables
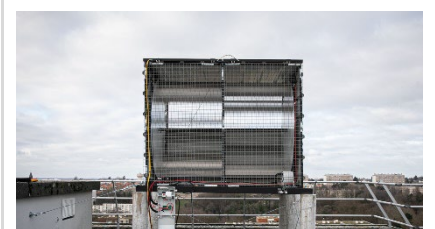
"For many years, environmentalists have looked forward to the coming of net-zero-energy buildings. Much effort was devoted to making lighting, heating, and cooling more efficient so buildings consumed less energy. But the net-zero target would never have been reachable without innovations in renewable-energy generation that let structures generate power on-site. Now residential and commercial buildings can be outfitted with roofing tiles that double as solar panels, or with rooftop boxes like this low-profile unit that transforms gusts of wind into electric current. This WindBox turbine, installed on the roof of a building in Rouen, France, is 1.6 meters tall, and has a 4-square-meter footprint (leaving plenty of space for solar panels or tiles). The unit, which weighs130 kilograms, can generate up to 2,500 kilowatt-hours of electricity per year (enough to meet roughly one-quarter of the energy needs of a typical U.S. household)."

Source: IEEE (24 March 2023)