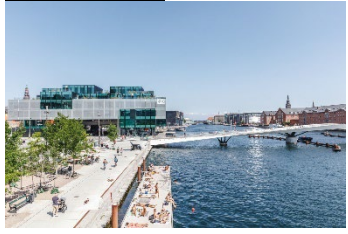


Weekly Discovery

We SHARE to inspire and ignite ideas!

26 Jun – 30 Jun 2023

ARCHITECTURE
Copenhagen Architecture City Guide: 20 Projects to Discover in the 2023 UNESCO World Capital of Architecture



"For most architecture enthusiasts, mentions of the city of Copenhagen will prompt images of pedestrian-friendly streets, suspended bike lanes, quaint water canals, and overall happy residents. The capital of Denmark has many accomplishments to boast over 60 percent of its residents commute to work by bike, it was among the first cities to set up a strategic plan to achieve carbon neutrality, resulting in an 80% decrease since 2009, and it has become of the most cited study cases for its urban planning and infrastructure. To add to the list, UNESCO has named Copenhagen the 2023 World Capital of Architecture, prompting an array of architecture-focused events and festivals. The title further emphasizes the city's position as a laboratory for innovative contemporary architecture and people-centred urban planning."

Source: [ArchDaily](#) (26 Jun 2023)

ARTS & CULTURE
Tape Heads



"When Peter Jackson's nearly eight-hour documentary *The Beatles: Get Back* came out in 2021, it did much more than draw a haunting portrayal of a mega-band on its last breath. It offered a rare peek into a moment of music history, a time that served as a short bridge between analogue and digital music technology. In the film, legendary session keyboardist Billy Preston plays with what looks like a little toy. He squints at it; he pokes at it with a Stylophone, a stylus prominent in David Bowie's "Space Oddity." Someone asks George Harrison about his "Leslie guitar," hooked up as it is to a Leslie loudspeaker surrounded by a rotating drum, giving the input instrument a warbly, wobbly sound."

Source: [JSTOR](#) (21 Jun 2023)

CLIMATE CHANGE
The Hope and Hype of Seaweed Farming For Carbon Removal



"Carbon removal has become an essential piece of our response to climate change, as the UN's climate change committee pointed out in a report last year. Estimates of exactly how much carbon we'll need to remove vary, but the consensus is that it will need to top a billion tons annually within the next few decades if we're going to keep warming below 2 °C over preindustrial levels and avoid the worst effects of climate change."

Source: [MIT TechReview](#) (22 Jun 2023)

CONSERVATION
Current conservation policies risk damaging global biodiversity, researchers argue



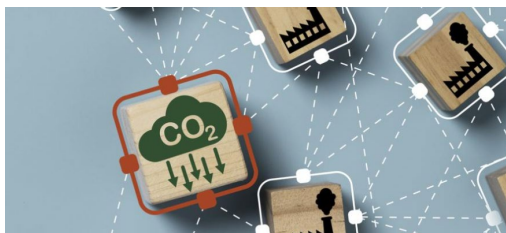
"'Green' farming policies may accelerate global biodiversity loss, two leading academics have warned."

Rewilding, organic farming and the so-called 'nature friendly farming' measures included in some government conservation policies risk worsening the global biodiversity crisis by reducing how much food is produced in a region, driving up food imports and increasing environmental damage overseas.

In an article published in the journal *Nature*, Professor Ian Bateman of the University of Exeter and Professor Andrew Balmford of the University of Cambridge urge policy-makers to consider a bolder approach known as 'land sparing', which they argue is cheaper, more effective, and avoids the displacement of food production and worsening the loss of wildlife habitats overseas."

Source: [Exeter](#) (23 Jun 2023)

CARBON
Will engineered carbon removal solve the climate crisis?



"A new IASA-led study explored fairness and feasibility in deep mitigation pathways with novel carbon dioxide removal, taking into account institutional capacity to implement mitigation measures."

Meeting the 1.5°C goal of the Paris Agreement will require ambitious climate action this decade. Difficult questions remain as to how warming can be limited within technical realities while respecting the common but differentiated responsibilities and respective capabilities of nations on the way to a sustainable future. Meeting this challenge requires substantial emissions reductions to reach net-zero emissions globally.

Among the new options being studied in scientific literature, engineered Carbon Dioxide Removal (CDR) like Direct Air Capture of CO2 with Carbon Capture and Storage (DACCS), is a potentially promising technology to help bridge this gap. DACCS captures carbon by passing ambient air over chemical solvents, which can be considered a form of CDR if the captured carbon is stored permanently underground. But whether these novel technologies can help make ambitious goals more attainable, or whether they can help reach them more equitably remains an open question."

Source: [Iiasa](#) (22 Jun 2023)

CYBER SECURITY
How secure are voice authentication systems really?

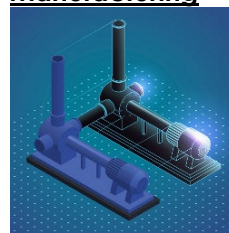


"Computer scientists at the University of Waterloo have discovered a method of attack that can successfully bypass voice authentication security systems with up to a 99% success rate after only six tries."

The Waterloo researchers have developed a method that evades spoofing countermeasures and can fool most voice authentication systems within six attempts. They identified the markers in deepfake audio that betray it is computer-generated, and wrote a program that removes these markers, making it indistinguishable from authentic audio."

Source: [UWaterloo](#) (27 Jun 2023)

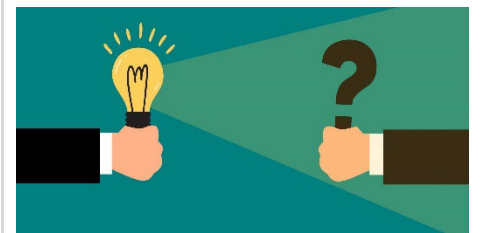
DIGITAL MANUFACTURING
Digital Twins and Dependency / Constraint-Aware AI for Digital Manufacturing



"Increasing productivity in manufacturing has been an elusive goal despite significant advances in factory automation technology and robotics. There are four main challenges currently facing manufacturers: low production efficiency; product defects and inconsistent quality; unforeseen machine maintenance; and high energy use and waste costs. The fourth industrial revolution—also referred to as Industry 4.0—sets out critical technological directions for addressing these grand challenges via data-driven digital manufacturing (DM) solutions incorporating novel computing technology that combines AI/machine learning (ML) and digital twins (DTs)4 for digitally representing complex physical industrial machine, products, and people in production."

Source: [ACM](#) (1 Jul 2023)

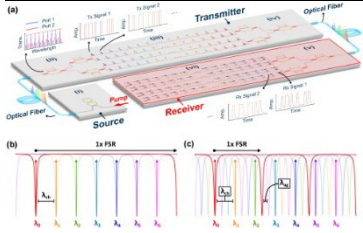
ECONOMICS
BRIDGING TRADITIONAL ECONOMICS AND ECONOPHYSICS



"In a new study, researchers of the Complexity Science Hub highlight the connecting elements between traditional financial market research and econophysics. "We want to create an overview of the models that exist in financial economics and those that researchers in physics and mathematics have developed so that everybody can benefit from it," explains Matthias Raddant from the Complexity Science Hub and the University for Continuing Education Krems."

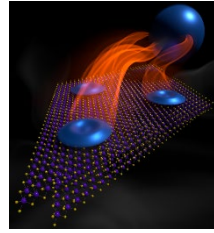
Source: [CSH](#) (15 Jun 2023)

OPTICS
Scaling comb-driven resonator-based DWDM silicon photonic links to multi-Tb/s in the multi-FSR regime



"The use of chip-based micro-resonator Kerr frequency combs in conjunction with dense wavelength-division multiplexing (DWDM) enables massively parallel intensity-modulated direct-detection data transmission with low energy consumption. Resonator-based modulators and filters used in such systems can limit the number of usable wavelength channels due to practical constraints on the maximum achievable free spectral range (FSR). In this work, we introduce the design of multi-Tb/s comb-driven resonator-based silicon photonic links by leveraging the multi-FSR regime. We demonstrate the viability of the link architecture with yield estimates that are supported by extensive water-scale measurements of 704 micro-resonators fabricated in a commercial complementary metal-oxide-semiconductor foundry."

QUANTUM COMPUTING
Researchers make a quantum computing leap with a magnetic twist



"Quantum computing could revolutionize our world. For specific and crucial tasks, it promises to be exponentially faster than the zero-or-one binary technology that underlies today's machines, from supercomputers in laboratories to smartphones in our pockets. But developing quantum computers hinges on building a stable network of qubits — or quantum bits — to store information, access it and perform computations."

Yet the qubit platforms unveiled to date have a common problem: They tend to be delicate and vulnerable to outside disturbances. Even a stray photon can cause trouble. Developing fault-tolerant qubits — which would be immune to external perturbations — could be the ultimate solution to this challenge.

A team led by scientists and engineers at the University of Washington has announced a significant advancement in this quest. In a pair of papers published June 14 in *Nature* and June 22 in *Science*, they report that, in experiments with flakes of semiconductor materials — each only a single layer of atoms thick — they detected signatures of "fractional quantum anomalous Hall" (FQAH) states. The team's

ROBOTICS
Teaching Robots How to Touch



"Touch is the first sense that humans develop before birth. It is an intimate, emotional way to communicate and can convey a lot of information."

I study touch in the context of human-robot interaction, for my PhD programme at Cornell University in Ithaca, New York. Communication through touch is important for social and companion robots.

We developed a soft robot 'skin' that enables touch-based interaction. Our robots can communicate through alterations to the shape, size and motion of textures on their skin. We can create goosebumps, like those that appear on the skin of someone who's excited. We can also create spikes, inspired by porcupinefish, which puff into a spiky ball when they're angry.. "

ROBOTICS
Emulating how krill swim to build a robotic platform for ocean navigation



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discoveries mark a first and promising step in constructing a type of fault-tolerant qubit because FQAH states can host anyons — strange “quasiparticles” that have only a fraction of an electron’s charge. Some types of anyons can be used to make what are called “topologically protected” qubits, which are stable against any small, local disturbances.”

Source: [Optica](#) (23 Jun 2023)

Source: [washington](#) (27 Jun 2023)

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Source: [Nature](#) (8 Jun 2023)

Source: [Brown](#) (26 Jun 2023)

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