SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

Weekly Discovery

We SHARE to inspire and ignite ideas!

8 - 12 May 2023

SECURITY

Apple, Google Partner to Combat Creepy Tracking Tactics

"Apple and Google have jointly proposed to the Internet Engineering Steering Group new standards for combatting clandestine surveillance through Bluetooth object-tracking devices like Apple's AirTag.

Apple and AirTag hope to have a plan to foil stealth tracking ready by year's end, with the solution to be circulated via iPhone and Android phone updates.

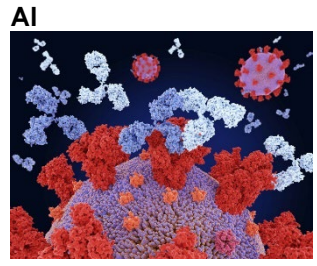
Erica Olsen at the National Network to End Domestic Violence's Safety Net Project said she believes the initiative will help protect abuse survivors and others targeted by stealth technology.

Olsen said the new standards "will minimise opportunities for abuse of this technology and decrease the burden on survivors in detecting unwanted trackers.""

Source: ACM (3 May 2023)

AI

Structured Exploration Allows Biological Brains to Learn Faster Than AI



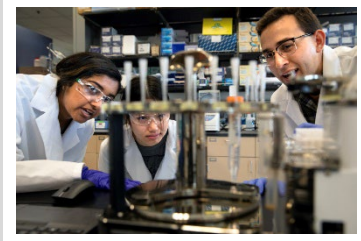
"At the height of the pandemic, researchers raced to develop some of the first effective treatments against COVID-19: antibody molecules isolated from the blood of people who had recovered from the disease.

Now, scientists have shown that generative artificial intelligence (AI) can provide a shortcut through some of this laborious process, suggesting sequences that boost the potency of antibodies against viruses such as SARS-CoV-2 and ebolavirus. A study published last week in Nature Biotechnology1 is part of growing efforts to apply 'neural networks' similar to those behind the ChatGPT AI platform to antibody design."

Source: Nature (4 May 2023)

AI

AI Could Run a Million Microbial Experiments Per Year



"Paul Jensen, Assistant Professor at University of Michigan Biomedical Engineering, and his graduate students have created an artificial intelligence agent that uses game-playing robots to answer scientific questions. BacterAI can assign autonomous scientific experiments for robots that eventually lead to answers that would normally take humans years to answer. Their Deep Phenotyping system has completed 931,038 automated experiments since January 2020."

Source: UMICH (4 May 2023)

ARCHITECTURE

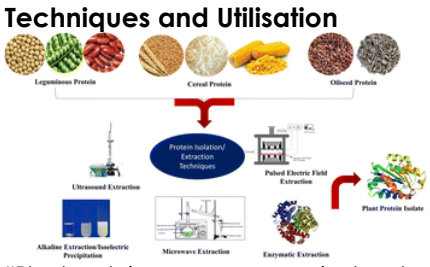
Outpost Offices / LOOP Design Studio

"Outpost's concept emerges from the configuration of vertical layers of the building's possible composition, related to activity or program, functionality, and separating spaces based on public, semi-private, and private designations. Public spaces that promote human relations and interaction between them and the outside extensions, for accessibility, recreation, and informal meetings. Semi-private and private healthy spaces for work with all the professional commodities that offer a lushed background."

Source: ArchDaily (7 May 2023)

FOOD SUSTAINABLE TECHNOLOGY

Sustainable Plant Protein: An Up-To-Date Overview of Sources, Extraction Techniques and Utilisation



"Plant proteins are an economical and versatile alternative to animal proteins because of their eco-friendly nature. Nowadays, leguminous, cereal and oilseed proteins are utilised as a source of plant-based proteins. Plant protein-based food products rich in plant protein help in body and tissue development for those who follow a vegetarian dietary regime. In addition, due to the growing consumer awareness of the shortcomings of animal proteins, today's research is engrossed in the cost-effective utilisation of plant proteins so that they can be better applied. For effective use of plant proteins, energy-efficient protein extraction techniques are required. Scientists today are aiming at non-thermal green technologies (microwave, ultrasound, pulsed electric field, enzyme assisted etc.) to improve extraction efficiency and reduce proteolysis during extraction. These novel techniques have no detrimental impact on the ecological system and the resulting proteins are safe for human use with only small quantities of toxic chemicals and solvents being used. Moreover, not only are food products being developed by using plant proteins, but edible and biodegradable packaging materials are also being developed using protein..."

Source: RSC (13 April 2023)

IOT

Engineers Tap into Good Vibrations to Power the Internet of Things

"The first of its kind and the product of a decade of work by researchers at the University of Waterloo and the University of Toronto, the novel generating system is compact, reliable, low-cost, and very, very green.

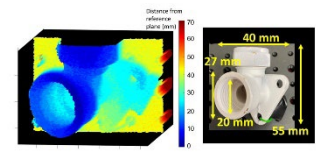
"Our breakthrough will have a significant social and economic impact by reducing our reliance on non-renewable power sources," said Asif Khan, a Waterloo researcher and co-author of a new study on the project. "We need these energy-generating materials more critically at this moment than at any other time in history."

The system Khan and his colleagues developed is based on the piezoelectric effect, which generates an electrical current by applying pressure — mechanical vibrations are one example — to an appropriate substance."

Source: UWaterloo (3 May 2023)

LIDAR

Quantum Lidar Prototype Acquires Real-Time 3D Images While Fully Submerged Underwater



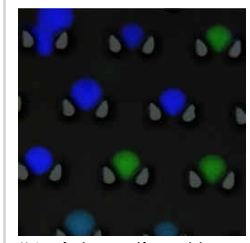
"For the first time, researchers have demonstrated a prototype lidar system that uses quantum detection technology to acquire 3D images while submerged underwater. The high sensitivity of this system could allow it to capture detailed information even in extremely low-light conditions found underwater.

"This technology could be useful for a wide range of applications," said research team member Aurora Maccarone, a Royal Academy of Engineering research fellow from Heriot-Watt University in the United Kingdom. "For example, it could be used to inspect underwater installations, such as underwater wind farm cables and the submerged structure of the turbines. Underwater lidar can also be used for monitoring or surveying submerged archaeology sites and for security and defence applications."

Source: Optica (4 May 2023)

NANOTECHNOLGY

The Future of Data Storage Lies in DNA Microcapsules



"An international team of researchers has added scalability to synthetic DNA data storage via a new polymerase chain reaction (PCR) technique.

Tom de Greef at the Netherlands' Eindhoven University of Technology led the team's development of protein-polymer microcapsules that self-seal above 50 degrees Celsius (122 degrees Fahrenheit), enabling PCR to occur separately in each capsule.

This "thermo-confined PCR" method reads 25 DNA data files simultaneously without major errors.

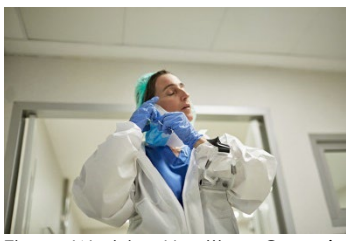
Reducing the temperature again causes the copies to detach from the capsule while keeping the anchored original file, preserving the original's quality.

Assigning a fluorescent label to each file and a unique colour to each capsule also eases data-library searches, which could enable a future system in which a robotic arm selects and reads specific files from a pool of capsules."

Source: ACM (5 May 2023)

PUBLIC HEALTH

WHO Declares End To COVID-19's Emergency Phase



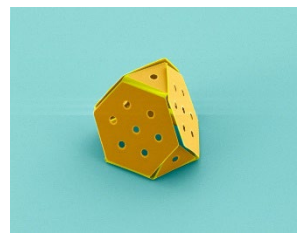
The World Health Organisation (WHO) announced Friday that COVID-19 is no longer a public health emergency of international concern, or PHEIC. WHO's director-general, Tedros Adhanom Ghebreyesus, made the decision following a recommendation by the organisation's COVID-19 emergency committee. During a meeting this Thursday, the committee highlighted the decreasing trend in deaths and hospitalisations, and the high levels of population immunity against SARS-CoV-2 as reasons for ending the PHEIC.

During a press conference the following day, Tedros emphasised that COVID-19 remains a global health threat and said that the new status doesn't mean that countries should let down their guard. "It is time for countries to transition from emergency mode to managing COVID-19 alongside other infectious diseases."

Source: Nature (5 May 2023)

SELF-ACTUATION

Self-Folding Origami Machines Powered by Chemical Reaction



"A Cornell-led collaboration harnessed chemical reactions to make microscale origami machines self-fold – freeing them from the liquids in which they usually function, so they can operate in dry environments and at room temperature.

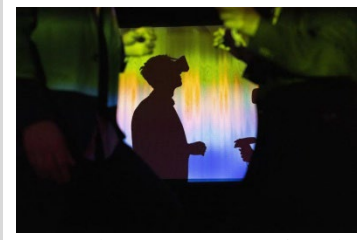
The approach could one day lead to the creation of a new fleet of tiny autonomous devices that can rapidly respond to their chemical environment.

The group's paper, "Gas-Phase Micro actuation Using Kinetically Controlled Surface States of Ultrathin Catalytic Sheets," published May 1 in Proceedings of the National Academy of Sciences."

Source: Cornell (2 May 2023)

VR

Music Could Be Key to Curbing Cybersickness



"Cybersickness – a type of motion sickness from virtual reality experiences such as computer games – significantly reduces when joyful music is part of the immersive experience, the study found.

The intensity of the nausea-related symptoms of cybersickness was also found to substantially decrease with both joyful and calming music..."

Source: ED (5 May 2023)

WEARABLES

A Touch-Responsive Fabric Armband – For Flexible Keyboards, Wearable Sketchpads

"It's time to roll up your sleeves for the next advance in wearable technology – a fabric armband that's actually a touch pad. In ACS Nano, researchers say they have devised a way to make playing video games, sketching cartoons and signing documents easier. Their proof-of-concept silk armband turns a person's forearm into a keyboard or sketchpad. The three-layer, touch-responsive material interprets what a user draws or types and converts it into images on a computer."

Source: ACS (2 May 2023)