SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

Weekly Discovery

We SHARE to inspire and ignite ideas!

26 - 30 December 2022

BIOMIMICRY

UA researchers' focus on tire traction leads to investigation of polar bear paws

"Traction is important. Humans have been continually interested in discovering how to better move across wet or frozen surfaces safely – whether to improve shoes for walking on sidewalks or tires to maneuver the roadways. But what makes it possible for some arctic animals to walk and run across the ice so effortlessly and gracefully without slipping and falling? Three researchers from The University of Akron (UA) took a deep dive into the paws of polar bears to find out."

Source: UAKRON! (12 December 2022)

AI

Using deep learning to monitor India's disappearing forest cover

"Using satellite monitoring data, researchers have developed a deep learning algorithm that could provide real-time monthly land use and land cover maps for parts of India."

Source: OSU (16 December 2022)

EV

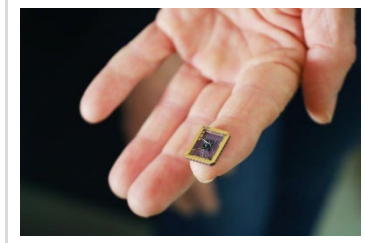
The EV Transition Explained: How to Meet Sales Targets? Policymakers differ on how to incentivize automakers and consumers

"To accelerate EV uptake, the Zero Emission Transportation Association, a lobbying group formed by Tesla, Lucid and Rivian along with some EV charging suppliers, asserts that sales of new internal combustion vehicles must be banned by 2030 and diesel trucks by 2035. Greenpeace, agrees, and argues that sales of all diesel and petrol vehicles, including hybrids must end by 2030. In addition, gasoline vehicles 15 years or older and diesel trucks over 10 years old should not be allowed on US roads, as is happening in some Indian cities."

Source: IEEE (23 December 2022)

ELECTRONICS

At the Edge of Graphene-Based Electronics



"Walter de Heer, Regents' Professor in the School of Physics at the Georgia Institute of Technology, has taken a critical step forward in making the case for a successor to silicon. De Heer and his collaborators developed a new nanoelectronics platform based on graphene — a single sheet of carbon atoms. The technology is compatible with conventional microelectronics manufacturing, a necessity for any viable alternative to silicon…the team may have also discovered a new quasiparticle. Their discovery could lead to manufacturing smaller, faster, more efficient, and more sustainable computer chips, and has potential implications for quantum and high-performance computing."

Source: Gatech (22 December 2022)

HEALTH TECH

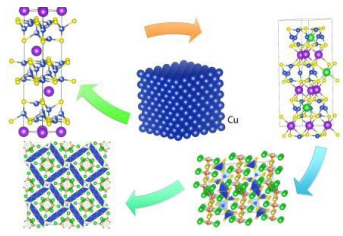
A Health-Monitoring Wearable That Measures Vital Signs This telehealth tech could ease overcrowding at care facilities

"The health-monitoring bracelet that Pramuka Sooriyapatabandige designed can measure vital signs such as heart rate, skin temperature, blood pressure, and blood oxygen saturation. What's more, the device should be inexpensive to manufacture and could be made in his native country of Sri Lanka, where access to health care can be difficult. The bracelet recently won first place in the IEEE Telehealth Virtual Pitch Competition student category."

Source: IEEE (20 December 2022)

MATERIALS

Making the unimaginable possible in materials discovery



"Chemists work in a similar way when inventing new compounds. Researchers at the U.S. Department of Energy's (DOE) Argonne National Laboratory, Northwestern University and The University of Chicago have developed a new method for discovering and making new crystalline materials with two or more elements."

Source: ANLI (20 December 2022)

MATERIALS

Easy way to spin nanofibers, inspired by silkworms

"The way that silkworms wind their cocoons from fibers in their slimy saliva is now helping scientists more easily make new biomedical materials. Researchers reporting in ACS' Nano Letters have mimicked the seemingly simple head bobbing of silkworms to create more consistent micro- and nanofibers with less equipment than other approaches."

Source: ACS (21 December 2022)

PHOTOSYNTHESIS

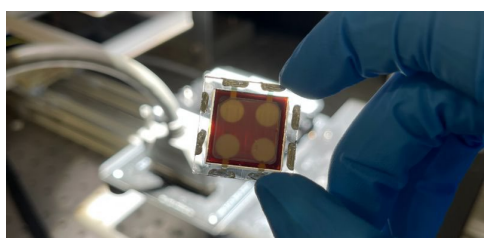
Decoding the secret language of photosynthesis

""The conductors of the symphony are proteins in the nucleus called photoreceptors that respond to light. We showed in this paper that both red and blue light-sensitive photoreceptors initiate the symphony. They activate genes that encode the building blocks of photosynthesis."

Source: UCR (15 December 2022)

SOLAR

Ammonium is the secret ingredient in stable, efficient & scalable perovskite solar cells



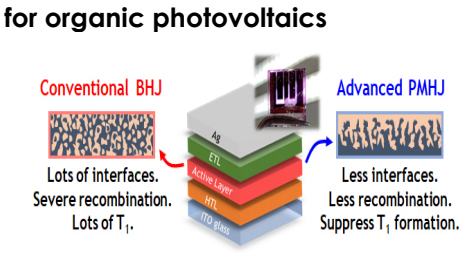
"A new pathway to creating durable, efficient perovskite photovoltaics at industrial scale has been demonstrated through the first effective use of lead acetate as a precursor in making formamidinium-caesium perovskite solar cells.

Members of Exciton Science, based at Monash University, were able to create perovskite solar cells with 21% efficiency, the best results ever recorded for a device made from a non-halide lead source."

Source: excitonscience! (22 December 2022)

SOLAR

CityU scientists discover a novel photophysical mechanism that has achieved record-breaking efficiency for organic photovoltaics



"Organic photovoltaics (OPVs) are a promising, economical, next-generation solar cell technology for scalable clean energy and wearable electronics. But the energy conversion loss due to the recombination of photogenerated charge carriers in OPVs has hindered further enhancement of their power conversion efficiency (PCE). Recently, researchers from City University of Hong Kong (CityU) overcame this obstacle by inventing a novel device-engineering strategy to successfully suppress the energy conversion loss, resulting in record-breaking efficiency.."

Source: CityU (21 December 2022)

SUSTAINANIBILITY

Biodegradable medical gowns may add to greenhouse gas

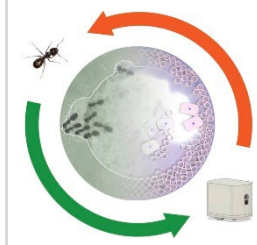
"Biodegradable medical gowns actually introduce harsh greenhouse gas discharge problems, according to new research published Dec. 20 in the Journal of Cleaner Production."

"Plasticized conventional medical gowns take many years to break down and the biodegradable gowns degrade much faster, but they produce gas emissions faster like added methane and carbon dioxide than regular ones in a landfill," said You, who is a senior faculty fellow in the Cornell Atkinson Center for Sustainability. "Maybe the conventional gowns is not so bad."."

Source: CORNELL (22 December 2022)

ROBOTICS

The physical intelligence of ant and robot collectives



"Individual ants are relatively simple creatures and yet a colony of ants can perform really complex tasks, such as intricate construction, foraging and defense.

Recently, Harvard researchers took inspiration from ants to design a team of relatively simple robots that can work collectively to perform complex tasks using only a few basic parameters."

Source: HARVARD (19 December 2022)

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