SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

Weekly Discovery

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10 FEBRUARY 2020 - 14 FEBRUARY 2020

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HealthCare	Robotics & Automation	Design & Innovation
Cybersecurity	Digital Design & Fabrication	Advanced Manufacturing

3D PRINTING

This Machine 3D Prints Bones for Better, Healthier Implants

"Customised implants generally use non-degradable materials such as polymer or titanium that don't behave like organic matter. In their research, Slots and Jensen found a material that would not only replace damaged bone, but encourage new bone to grow back."

Source: Wired (7 February 2020)

3D PRINTING

U of T Researchers Turn Mcdonald's Deep Fryer Oil into High-End 3D Printing Resin

"Researchers at the University of Toronto Scarborough have, for the first time, turned waste cooking oil – from the deep fryers of a local McDonald's – into a high-resolution, biodegradable 3D printing resin."

Source: University of Toronto (30 January 2020)

ARCHITECTURE

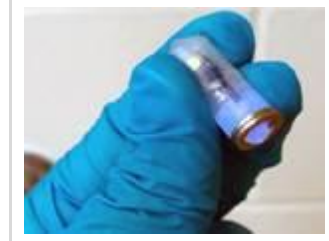
Asif Khan Unveils Carbon-Fibre Latticed Gates for Dubai Expo 2020

"The pattern, which has a shifting geometry when viewed from different angles, was determined by the complex equations required to balance the desired shading, air flow and dimensions."

Source: Dezeen (10 February 2020)

BIOMEDICAL DEVICE

Light Activation Offers Non-Invasive Removal of Medical Implants

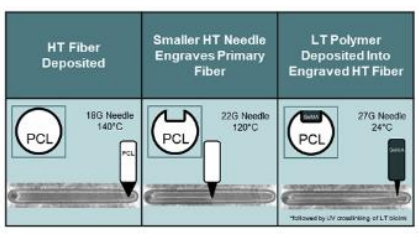


"The key to the design is a light-sensitive hydrogel that degrades when irradiated with blue or ultraviolet light. This type of gel is too weak to survive for long inside the body, so the researchers made it more durable by combining it with a stronger polymer network."

Source: Physics World (10 February 2020)

BIOPRINTING

Bioengineers 3D-Print Implants to Seed Multiple Layers of Tissue



Source: Bioprinting

"The Rice University team led by Antonios Mikos says otherwise with its development of a groovy method to seed sophisticated, 3D-printed tissue-engineering scaffolds with living cells to help heal injuries."

Also read at Bioprinting.

Source: Science Daily (8 February 2020)

COVID-19

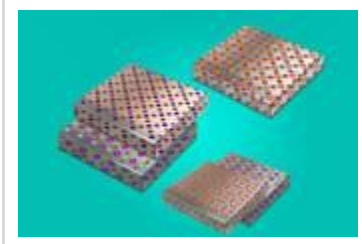
Scientists Are Racing to Model the Next Moves of a Coronavirus That's Still Hard to Predict

"So, how seriously should this model, and the dozens of other computer simulations of the outbreak, be taken? Scientists studying the 2019-nCoV outbreak are getting plenty of data to groundtruth and tweak their models."

Source: Science Magazine (7 February 2020)

ELECTRONICS

Engineers Mix and Match Materials to Make New Stretchy Electronics



"In a paper published today in the journal Nature, the researchers demonstrate that they can use remote epitaxy to produce freestanding films of any functional material. More importantly, they can stack films made from these different materials, to produce flexible, multifunctional electronic devices."

Source: MIT News (5 February 2020)

ENERGY

New Droplet-Based Electricity Generator: A Drop of Water Generates 140V Power, Lighting Up 100 LED Bulbs

"A research team has recently developed a droplet-based electricity generator (DEG), featured with a field-effect transistor (FET)-like structure that allows for high energy-conversion efficiency and instantaneous power density increased by thousands times compared to its counterparts without FET-like structure."

Read more at Nature.

Source: Science Daily (5 February 2020)

HEALTHCARE

UC Smartphone Lab Delivers Test Results in 'Spit' Second

"With a single drop of blood or saliva on a custom plastic lab chip UC designed, the device smaller than a credit card can diagnose infectious diseases such as coronavirus, malaria, HIV or Lyme disease or countless other health conditions like depression and anxiety."

Source: UC News (6 February 2020)

MATERIALS SCIENCE

These Israeli Startups Develop Breakthrough Technology to Stop Outbreak as the World Awaits Vaccine for the Coronavirus

"An Israeli startup called Sonovia is creating a washable antiviral fabric that kills bacteria and viruses upon contact. Sonovia uses soundwaves to impregnate the surface of the fabric with metallic nanoparticles like zinc oxide and copper oxide."

Source: Tech Starups (6 February 2020)

MEDICAL DEVICE

Wearable Patch Uses Machine Learning to Detect Sleep Apnea

"For long-term, more convenient monitoring of sleep apnea, a team of researchers has developed a wearable device that tracks a user's breathing. The device uses a unique combination of bioimpedance (a measurement of electrical signals passing through the body) and machine learning algorithms."

Source: IEEE Spectrum (7 February 2020)

RESEARCH METHODS

Study of the Export Behavior of Small and Medium-Sized Manufacturers in Minnesota Using Quantitative Correlational Analysis

"This case reviews the process of conducting research using an Internet-based survey and quantitative correlational analysis, provides several factors that can contribute to the success of this approach, and discusses the relative merits of a quantitative versus qualitative method of research."

Source: Sage Research Methods (2020)

ROBOTICS

Robots That Use Language

"This article surveys the use of natural language in robotics from a robotics point of view. To use human language, robots must map words to aspects of the physical world, mediated by the robot's sensors and actuators. This problem differs from other natural language processing domains due to the need to ground the language to noisy percepts and physical actions."

Source: Annual Review of Control, Robotics, and Autonomous Systems (31 January 2020)

SIGNALS

A Smart Surface for Smart Devices

"That's the idea behind the CSAIL team's new system RFocus, a software-controlled 'smart surface' that uses more than 3,000 antennas to maximize the strength of the signal at the receiver. Tests showed that RFocus could improve the average signal strength by a factor of almost 10."

Source: MIT News (3 February 2020)

TECHNOLOGY

New Technology Could Help Solve AI's 'Memory Bottleneck'

"Electrical engineers at Northwestern University and the University of Messina in Italy have developed a new magnetic memory device that could potentially support the surge of data-centric computing, which requires ever-increasing power, storage and speed."

Source: TechXplore (10 February 2020)

WATER DESALINATION

Simple, Solar-Powered Water Desalination

"A completely passive solar-powered desalination system developed by researchers at MIT and in China could provide more than 1.5 gallons of fresh drinking water per hour for every square meter of solar collecting area. Such systems could potentially serve off-grid arid coastal areas to provide an efficient, low-cost water source."

Source: MIT News (6 February 2020)

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