SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

Weekly Discovery

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27 July – 31 July 2020

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Cybersecurity	Digital Design & Fabrication	Advanced Manufacturing

3D DESIGN

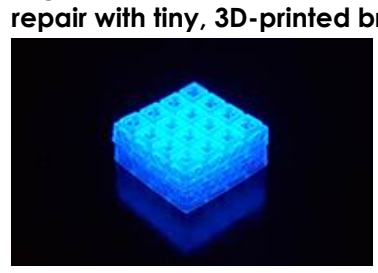
Better simulation meshes well for design software (and more)

" To simulate physical systems in 3D, researchers often program computers to divide objects into sets of smaller elements, a procedure known as "meshing." Most meshing approaches tile 2D objects with patterns of triangles or quadrilaterals (quads), and tile 3D objects with patterns of triangular pyramids (tetrahedra) or bent cubes (hexahedra, or "hexes")."

Source: MIT News (20 July 2020)

3D PRINTING

Lego-inspired bone and soft tissue repair with tiny, 3D-printed bricks

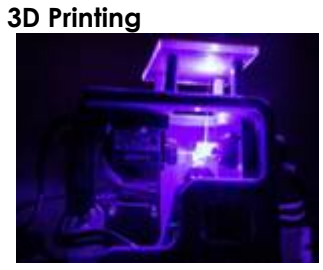


"Inspired by Lego blocks, the small, hollow bricks serve as scaffolding onto which both hard and soft tissue can regrow better than today's standard regeneration methods, according to new research published in Advanced Materials. Each brick is 1.5 millimeters cubed, or roughly the size of a small flea."

Source: OHSU (24 July 2020)

3D PRINTING

Laser inversion Enables Multi-Materials 3D Printing



Researchers invent new technique that could transform additive manufacturing processes, potentially enabling the printing of circuit boards, electromechanical components, and perhaps even robots"

Source: EurekAlert! (27 July 2020)

AI

Attention Rogue Drone Pilots: AI Can See You!

" The minute details of rogue drone's movements in the air may unwittingly reveal the drone pilot's location—possibly enabling authorities to bring the drone down before, say, it has the opportunity to disrupt air traffic or cause an accident. And it's possible without requiring expensive arrays of radio triangulation and signal-location antennas."

Source: IEEE Spectrum (23 July 2020)

ARCHITECTURE DESIGN

The Contemporary Remodelling of Traditional Materials in Chinese Vernacular Architecture

"This article gives an overview of how traditional materials, such as tiles, metal, rocks, bamboo, wooden sticks, timber, rammed earth and bricks are being transformed through vernacular architecture in China."

Source: Arch Daily (27 July 2020)

BIOLOGY & MATHS

Researchers use cell imaging and mathematical modeling to understand cancer progression

" Using a combination of experiments and mathematical modeling, a team of researchers from the Virginia Tech Department of Biological Sciences in the College of Science and the Fralin Life Sciences Institute are beginning to unravel the mechanisms that lie behind tetraploidy - a chromosomal abnormality that is often found in malignant tumors."

Source: EUREKALERT(24 July 2020)

CYBERSECURITY

Randomness theory could hold key to internet security

" Researchers identified a problem that holds the key to whether all encryption can be broken -- as well as a surprising connection to a mathematical concept that aims to define and measure randomness."

Source: Sciencedaily (27 July 2020)

DESIGN

How different wheelchair designs can help Paralympians excel

"Not all contenders in the games, which typically run after the Olympics, use wheelchairs, but those who do showcase some of the most technologically advanced assistive devices in the world. Each sport requires different tweaks to the standard chair; we break down a few of them here."

Source: Popular Science (26 July 2020)

GADGETS

Digital Guide Dog for Blind People

"The electronic tool is called Theia and it features gyroscope-based technology to pull the user in the correct direction. This is similar to how many virtual reality controllers work, but the direction of the pull would be decided using a mapping system that takes into consideration the ease and safety of a given path and other matters important to blind people."

Source: Medgadget (24 July 2020)

GRAPHICS

More realistic computer graphics

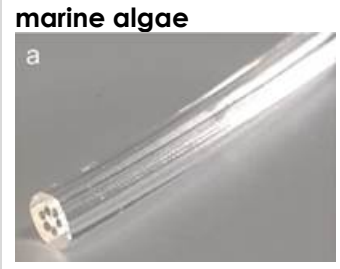
Source: Dartmouth College

"New software techniques make lighting in computer-generated images look more realistic for use in video games, extended reality, and scientific visualization tools."

Source: Science Daily(24 July 2020)

MATERIAL SCIENCE

Brazilian researchers develop an optical fiber made of gel derived from marine algae



" An optical fiber made of agar has been produced at the University of Campinas (UNICAMP) in the state of São Paulo, Brazil. This device is edible, biocompatible and biodegradable. It can be used in vivo for body structure imaging, localized light delivery in phototherapy or optogenetics (e.g., stimulating neurons with light to study neural circuits in a living brain), and localized drug delivery."

Source: FAPESP (24 July 2020)

MATERIALS SCIENCE

Soft robot actuators heal themselves

"Now a team of researchers has a biosynthetic polymer, patterned after squid ring teeth, that is self-healing and biodegradable, creating a material not only good for actuators, but also for hazmat suits and other applications where tiny holes could cause a danger. Read more in Nature."

Source: Phys.Org (27 July 2020)

POWER TECHNOLOGY

Microsoft Claims a First in Hydrogen-Fueled Data Center Test

"The company said it was able to power a row of servers with a 250kW hydrogen fuel cell system for 48 hours."

Source: Data Center Knowledge(28 July 2020)

RESEARCH & OPEN ACCESS

Developing a new generation of scientist communicators through effective public outreach

"Science disengagement amongst school children remains a global challenge, leading to calls for more scientists to engage with the public. Here the authors discuss how a voluntary, flexible program can enhance graduate attributes in addition to addressing barriers to public engagement."

Source: Nature(12 July 2020)

ROBOTICS

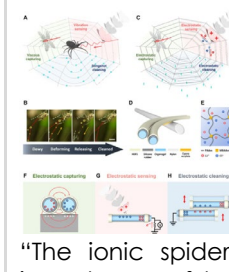
Remotely Operated Robot Takes Straight Razor to Face of Brave Roboticist

"Roboticist John Peter Whitney put his neck on the line to test this cutting-edge robotic device. It's powered by fluidic actuators that use tubes containing water to transmit forces from a primary stage to a secondary stage."

Source: IEEE Spectrum (28 July 2020)

SOFT ROBOTICS

Ionic spiderwebs



"The ionic spiderwebs demonstrate the importance of learning from nature and push the boundaries of soft robotics in an attempt to combine mutually complementary functions into a single unit with a simple structure.""

Source: Science Robotics (15 July 2020)

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