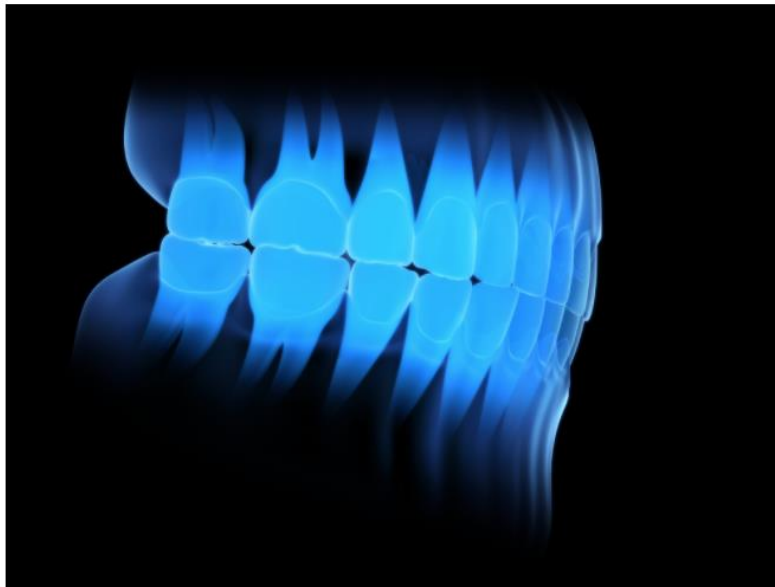


THE VANGUARD

The 5 Coolest Things on Earth This Week

Oct 20, 2017 by [Tomas Kellner](#)



Scientists in the U.K. created a Terminator-like programmable metal, their peers in London found a way for teeth to fix themselves, and spray-concrete developed in Canada can withstand even the most powerful temblor. We've seen some earthshaking science this week.

A Bridge To The Future



The team printed used a customized printer to lay down layers of concrete, one after another, and include steel reinforcement at the same time. Image credit: Eindhoven University of Technology.

What is it? Officials in the Netherlands opened the world's first bridge 3D-printed from pre-stressed concrete. The bicycle bridge is 8 meters long, 3.5 meters wide, and can handle 5 tons.

Why does it matter? The team at the Eindhoven University of Technology that printed the bridge said it required "much less concrete" than bridges made the traditional way: filling a mold with concrete. Less concrete also mean less cement, the production of which generates a lot of carbon emissions. 3D printing also gives designers the freedom to create any shape they desire.

How does it work? The team printed used a customized printer to lay down layers of concrete, one after another, and include steel reinforcement at the same time. "When laying a strip of concrete the concrete printer adds a steel cable so that the bridge is 'pre-stressed' so that no tensile stress can occur in the concrete, because this is something that concrete is not able to cope with adequately," the university [said](#).

Terminator 2D



What is it? Scientists at the University of Sussex and Swansea University have developed a new liquid metal they can manipulate, Terminator-style, with electrical current to form two-dimensional shapes and letters. “While the invention might bring to mind the film Terminator 2, in which the title character morphs out of a pool of liquid metal, the creation of 3D shapes is still some way off,” the university cautioned. “More immediate applications could include reprogrammable circuit boards and conductive ink.”

Why does it matter? “The team says the findings represent an ‘extremely promising’ new class of materials that can be programmed to seamlessly change shape,” according to the University of Sussex. “This opens up new possibilities in ‘soft robotics’ and shape-changing displays.”

How does it work? The team used electric fields programmed by a computer to shape the material. “One of the long-term visions of us and many other researchers is to change the physical shape, appearance and functionality of any object through digital control to create intelligent, dexterous and useful objects that exceed the functionality of any current display or robot,” said University of Sussex professor Sriram Subramanian.

Shaking Off Earthquakes

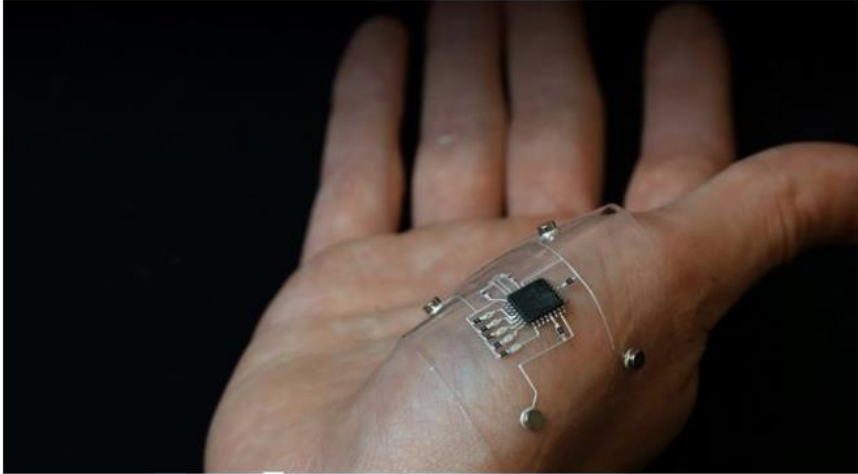


What is it? Researchers at the University of British Columbia have developed a spray-on, earthquake-resistant concrete and exposed it to simulated temblors “as high as the magnitude 9.0–9.1 earthquake that struck Tohoku, Japan in 2011.” It survived.

Why does it matter? Walls covered with layers of the material just 10 millimeters thick withstood “Tohoku-level quakes and other types and intensities of earthquakes,” said Salman Soleimani-Dashtaki, a Ph.D. candidate in the department of civil engineering at the university. “We couldn’t break them,” he added. The team plans to use it to “retrofit a school in Roorkee in Uttarakhand, a highly seismic area in northern India,” according to the university.

How does it work? The composite material is similar to steel and “engineered at the molecular scale to be strong, malleable, and ductile.” It combines “cement with polymer-based fibers, fly ash and other industrial additives, making it highly sustainable,” said Nemy Banthia, a civil engineering professor who supervised the work. The team said that instead of fracturing, the material bends during an earthquake.

Smart Skin



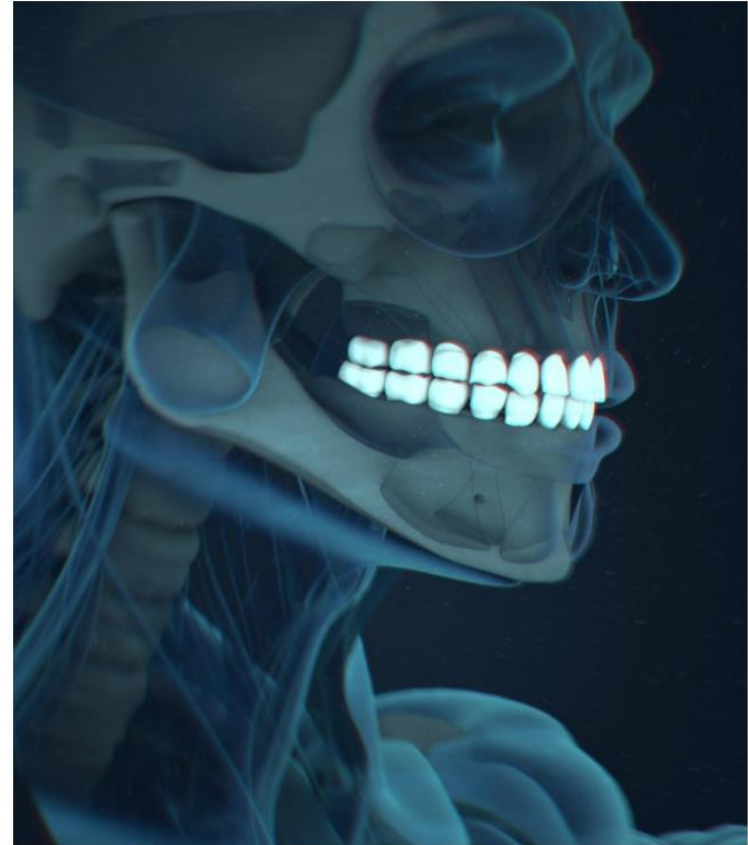
A technique called Hybrid 3-D printing, developed by Air Force Research Laboratory researchers in collaboration with the Wyss Institute at Harvard University, uses additive manufacturing to integrate soft, conductive inks with material substrates to create stretchable electronic devices. A potential application is to create sensors to enable better human performance monitoring. Caption and image credit: Harvard Wyss Institute.

What is it? Researchers working at Harvard's Wyss Institute and Air Force Research Laboratory (AFRL) used "soft, conductive inks" to 3D print wearable electronics that could be used for skin sensors monitoring human performance and other devices.

Why does it matter? Dan Berrigan, a research scientist at the AFRL Materials and Manufacturing Directorate, said that "skin-worn electronics have the potential to provide feedback on movement, body temperature, fatigue, hydration and other metrics crucial to understanding" performance. When the team printed sensors on a stretchable sleeve, it was "able to respond to the movement of the wearer's arm."

How does it work? Berrigan said that team used a 3D printer to trace out the sensor from "flexible, silver-infused polyurethane" and inserted microcontroller chips and LED lights into the material. The devices "were able to maintain function even after being stretched by more than 30 percent from original size," AFRL reported.

Pulp Nonfiction



"The novel, biological approach could see teeth use their natural ability to repair large cavities rather than using cements or fillings," the King's University reported. Top and above images credit: Getty Images.

What is it? A team at King's College London discovered that an experimental drug used to treat Alzheimer's disease can stimulate stem cells in "tooth pulp" to fix teeth sans the drill.

Why does matter? "The novel, biological approach could see teeth use their natural ability to repair large cavities rather than using cements or fillings," the university reported. Need we say more?