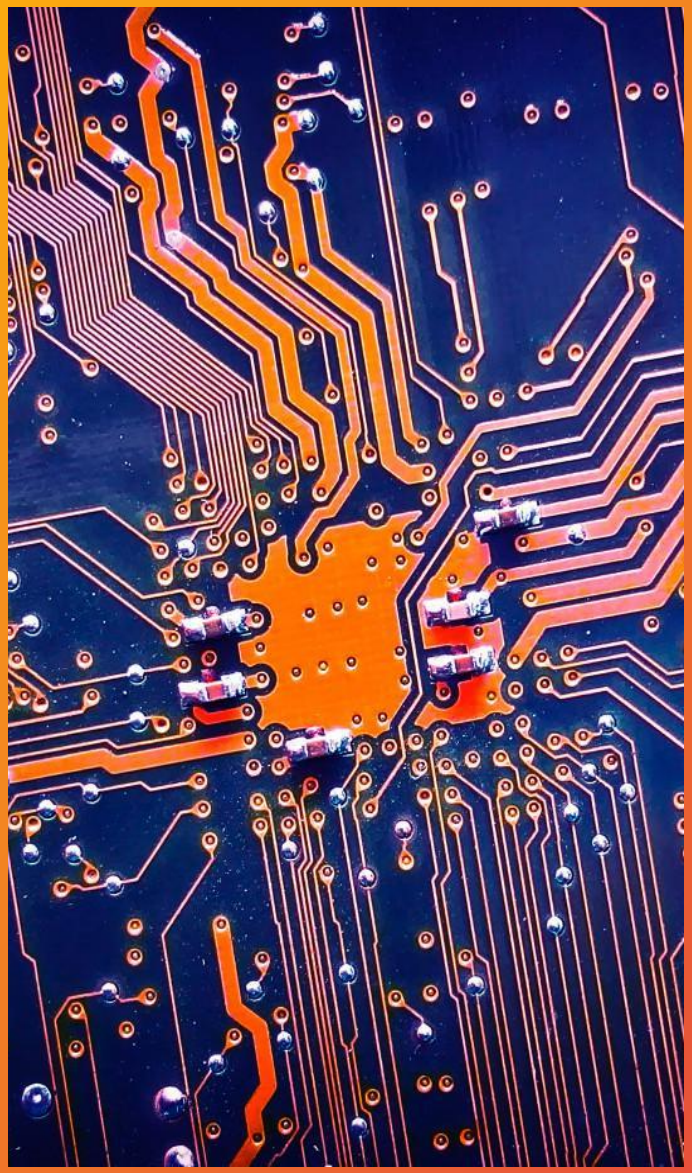

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Polyrific Culture Talk #15

Technologies that inspire

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9/27/2021

Sound wave fire extin-gui sher

Two engineering students from George Mason University have invented a new fire extinguisher, capable of putting out flames by manipulating sound waves.

The sonic fire extinguisher by two final-year undergraduate engineering students, Seth Robertson and Viet Tran, uses sound waves spread through a mobile subwoofer gun to put out flames, rather than the chemical compounds used by traditional fire extinguishers.

As sound is a pressure wave that oscillates between high and low regions of pressure it can create a vacuum that separates air molecules from the sounds of the flame.

The two students will now work on further developing the device, so it can be used on larger fires. While the sonic fire extinguisher will initially be used on small fires such as grease fires on stovetops, Tran and Robertson say the technology could eventually be used to equip fleets of drones to combat fires.

Read more

Man with the Golden arm: Blood donation story

When James Harrison turned 18 he started donating blood and plasma regularly - every three weeks or so for 11 years.

In the 1960s Doctors were struggling with cases of a potentially fatal condition called Rh incompatibility, also known as rhesus isoimmunization or Rh disease. It occurs when a pregnant woman has an Rh-negative blood type but the fetus she's carrying is Rh-positive.

In some pregnant women, Rh disease causes their antibodies to attack the fetus's red blood cells. Scientists needed a way to turn this reaction off, and in Harrison's blood, they found it: a rare antibody known as Rh (D) immune globulin or anti-D.

James Harrison: *"I was prepared and wanted to give something back," he says. "And I've been donating for 60 years."* At this point, James has donated enough to save an estimated 2 million babies — including his own grandson, Scott. In 2011, when Scott turned 16, he made his first donation, sitting right next to his grandfather — who was making his 1,000th.

On 11 May 2018, he made his 1,173rd donation – his last, as Australian policy prohibits blood donations from those past age 81.
The Australian Red Cross knows of about 50 people who can donate plasma with anti-D, and they say that's just enough for the demand.

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Lithium sulfur battery

Among the many exciting chemistries being pursued for next-generation batteries, lithium-sulfur is one with significant potential, owing to its ability to store up to five times as much energy as today's lithium-ion solutions. Scientists in Australia have come up with a new design for this promising architecture that involves adding sugar to address inherent stability issues, a move that keeps the experimental cells ticking across more than 1,000 cycles.

Last year, a team of battery researchers at Monash University in Melbourne came up with a solution to one half of this problem. The scientists developed a special binding agent that creates extra space around the sulfur particles, which means that they have more room to safely expand during charging. The upshot of this was a high-capacity lithium-sulfur battery capable of surviving more than 200 cycles.

"So each charge lasts longer, extending the battery's life," says first author and PhD student Yingyi Huang. *"And manufacturing the batteries doesn't require exotic, toxic, and expensive materials."*

Lithium sulfur battery

There are still some kinks to iron out before lithium sulfur batteries are put to work in smartphones and electric vehicles, but the hope is that when they do they'll enable them to be used for far longer periods, or across far greater distances, in between charges. The researchers say their technology has the potential to store two to five times the energy of today's lithium batteries, and with this new study, believe they've taken a key step toward its real-world use.

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Ice Stupas

“The ice needed to be shaded – but how?” he says. “We couldn’t have it under a bridge, or use reflectors, which aren’t practical at scale. So we thought of this conical shape: making ice shade itself.”

The conical shape hit a sweet spot, maximising the volume of ice that can be “grown”, while minimising the surface area exposed to direct sunlight. That means it keeps melting well into the spring, releasing up to 5,000 litres of water each day by “storing it in the sky”, Wangchuk says.

It also has the benefit of resembling the Buddhist stupas – religious sites used for meditation and worship – that dot the landscape, a crucial point for 50-year-old. “Because it resembles something we have in our tradition, it is made more close to the population, to their hearts,” he says.

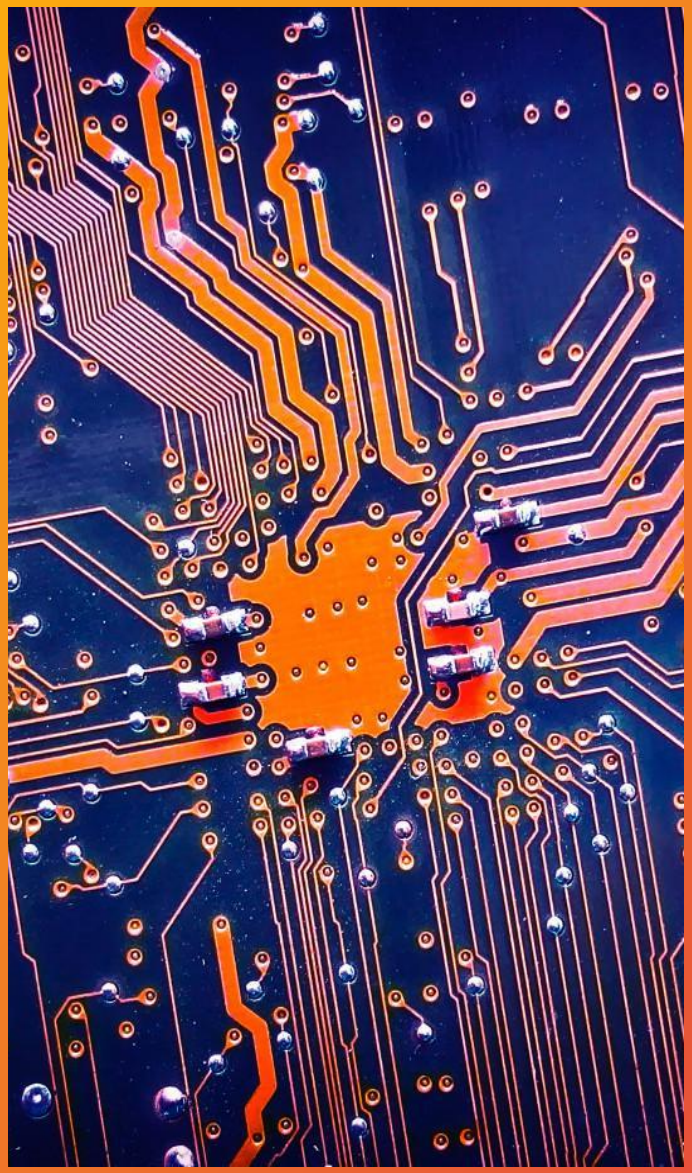
And the stupas are simple. They are formed by running pipes below the frost line, at which temperature the water hovers between a liquid and solid state. Then the pipes turn skywards, spraying the water into -20C air, using the bitter cold to freeze it as it falls to earth.

Ice Stupas

The first prototype, stretching 20 feet high, was built in October 2013, and expected to melt by the beginning of May. It lasted eighteen days longer. A second much larger stupa was grown near a forest of 5,000 trees, and kept them watered throughout the driest months until 6 July.

Those two stupas were funded by crowdsourcing donations. Last year, Wangchuk was awarded a Rolex innovation grant, money he will use to create the next generation of ice towers. 20 more, each 100 feet high, are in the works.

Read more



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Thank You!

9/27/2021