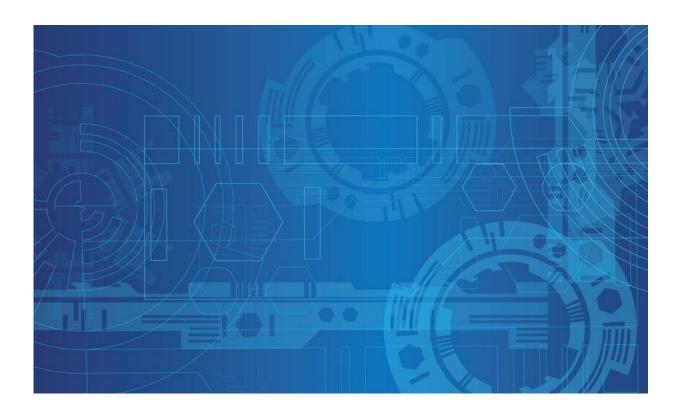# Best of Last Year—The top Tech Xplore articles of 2018

December 24 2018, by Bob Yirka

Credit: CC0 Public Domain

It was a great year for technological innovation as a team at MIT announced that they had flown the first-ever plane with no moving parts. Instead of turbines, propellers or even fans, the new plane was powered by an "ionic wind"—a flow of ions produced by the plane that generated enough thrust to push the small prototype through the air long enough to

produce sustained, steady flight.

Also, a team of engineers at Penn State created [a self-heating, fast-charging battery that make electric vehicles climate-immune](#). Traditional batteries used to propel cars do not charge well in temperatures below 50° F. The new battery self-heats, allowing rapid charging in all climates, making the sale of electric cars more likely in colder places.

Robert König with TUM, David Gosset with the Institute for Quantum Computing at the University of Waterloo and Sergey Bravyi with IBM reported [the first proof of a quantum computer advantage](#). Previously, scientists and engineers had to work under little more than a belief that quantum computer development would eventually pay off in next-level computer systems.

Also, a team of engineers at the University of Maryland found [a way to make wood as strong as titanium alloys, but lighter and cheaper](#). The treatment made regular wood 12 times stronger than natural wood and 10 times tougher. The result was a material equal in strength to many titanium alloys, but much lighter, making it a strong competitor for applications that use steel or titanium alloys.

And a team of computer scientists at the Harvard John A. Paulson School of Engineering and Applied Sciences developed [a 'breakthrough' algorithm that was exponentially faster than any previous one](#). It is expected to speed up a range of applications by reducing the number of parallel steps required to reach a solution. The team presented their approach at this past year's ACM Symposium on Theory of Computing.

A team of engineers at Caltech [taught a drone to herd birds away from airports autonomously](#). The team reported that their work was inspired by the 2009 "Miracle on the Hudson," when a plane was forced to land in the Hudson River after losing all of its engines to a bird strike just

after takeoff. The team used a mathematical model of flocking dynamics to describe flocking behavior.

And a team of researchers at Australia's Royal Melbourne Institute of Technology developed [a printed font that helps readers remember what they read—Sans Forgetica](#). The individual letters have omitted segments that force the reader to pay more attention. The team claimed it was the first font ever created to help people better remember what they read.

A team at The University of Texas developed [a new molecular programming language called CRN++](#). It allows for programming deterministic chemical kinetics in performing computations. They also built a compiler that translates the code into chemical reactions.

And a team at RMIT University in Australia demonstrated for the first time a working rechargeable "proton battery" that could change how homes, devices and vehicles are wired. [The battery breakthrough,](#) was described as both environmentally friendly and capable of storing more energy than lithium-ion batteries. The battery was based on a carbon electrode used as a hydrogen store, coupled with a reversible cell to produce electricity on demand.

Also, a team of computer scientists at Columbia Engineering found [a way to hide information in plain text](#). Their FontCode allowed for embedding hidden information in ordinary text by ever-so-slightly changing the shape of characters in a font. The receiver could then decipher the code by noting the font perturbations. The team presented their scheme at this past year's SIGGRAPH.

And officials running the Walney Extension announced that [the world's largest offshore wind farm had swung into action](#). Located in the Irish Sea offshore from Walney Island, the Walney Extension Offshore Wind Farm occupies approximately 145 square kilometers. Officials projected

the wind farm would provide enough electricity to power 600,000 homes in the U.K.

Also, a team of researchers at Google developed an AI that can predict heart disease by analyzing pictures of the retina. The artificial intelligence application focuses on retinal blood vessels that might be offering hints of a cardiovascular episode. They reported that the app is 70 percent accurate in tests, roughly equivalent to blood tests.

And a team at UC Davis developed a tool that uses machine learning for cross-lingual and cross-platform rumor verification. Its purpose is to verify multimedia rumors online. The new tool is meant to discover what is real versus what is rumor by leveraging the semantic similarity between rumors and other information sources. The hope is that such applications will help reduce the number of rumor-based online news stories.

Also, a group of engineers at MIT developed what they described as a "sun in a box"—a renewable energy store for the grid. Their conceptual design called for a system to store both solar and wind power and deliver that energy back to the electrical grid on demand. The system would also be large enough to power a small city during periods when the sun was obscured or the wind was not blowing.

And engineers at the University of Washington announced that the first wireless flying robotic insect took wing. The achievement marked the first time that a wing-powered, insect-like robot was able to fly without a power tether. The new design was both lighter and smarter than previous designs. The team presented their RoboFly at this past year's International Conference on Robotics and Automation.

Also, a team of researchers at North Carolina State University compiled a new database of executable Python code snippets on GitHub. Called

Gistable, the database offers coders a means for evaluating code created by others for general use. The code in the database was thoroughly evaluated by experts to ensure that it works as intended, without errors.

And the European Commission announced that [a Greek island would be powered by wind and solar technology](#). The small island of Tilos was set to become the first island in the Mediterranean to be powered only on wind and solar sources. Over the summer, technicians worked to complete the final touches, which included installing high-tech rechargeable batteries. The plan is for the island to serve as a blueprint for other islands that belong to the European Union, which has funded the project.

Also, a team at Google's DeepMind [developed neural arithmetic logic units](#). The new architecture addressed previous limitations that prevented computers from carrying out quantitative type reasoning regarding numerical representations. They reported that the new system achieved better generalizations both inside and outside of the range of numerical values that the system has been trained to recognize.

And a trio of researchers at Carnegie Mellon University noted that [Moore's law has ended and asked what comes next](#). The notion that computing power doubles every year came to an end, leading Hassan Khan, David Hounshell and Erica Fuchs to speculate about what might come next to speed future computers. Their review includes possible innovations that are likely to make a mark, but they note that some as-yet unknown technology is required.

Also, a team of researchers at Chalmers University of Technology in Sweden conducted a study into a new way to store energy for automobiles. They found that [carbon fiber could store energy in the body of a vehicle](#), working as battery electrodes or by storing the energy directly. They note that in such a system, the carbon fibers would

actually become part of the body of the vehicle, significantly reducing the weight typical of energy storage solutions in cars.

And a collaboration between researchers from Cypress University of Technology, UCL, the University of Alabama and Boston University resulted in an investigation of state-sponsored trolls. By analyzing data from Twitter and Reddit, they were able to trace the activities of bad actors over time. They found that the majority were from Russia and Iran, and that they generally attempted to pose as legitimate users from a host of countries around the globe.

Also, a group at Shree Devi Institute of Technology in India explored the idea of digital resurrection of consciousness using AI. In their study, they looked at the idea of using AI applications to allow people to conduct virtual communications with departed loved ones. Such applications would allow an AI to converse similarly to the deceased by analyzing their personal characteristics.

And a team at Stanford University developed a water-based battery to store solar and wind energy, an inexpensive way to store energy in large concentrations. Their prototype was based on a manganese-hydrogen battery, stood just three inches tall, and produced just 20 milliwatt hours of electricity. But they noted that the design could easily be scaled up to much larger applications.

And finally, a group of engineers at the University of Toronto developed a hand-held 3-D skin printer. They reported that the device was capable of printing and depositing even layers of skin tissue on a deep wound, representing an improved way to treat large wounds. They suggest that theirs is the first technology to deliver skin tissue in situ, and hope that it will be ready for clinical trials soon.

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