The Most Important Scientific Discoveries of 2017

There were many interesting and important breakthroughs in science last year. This article will outline the most important ones that you need to know about.

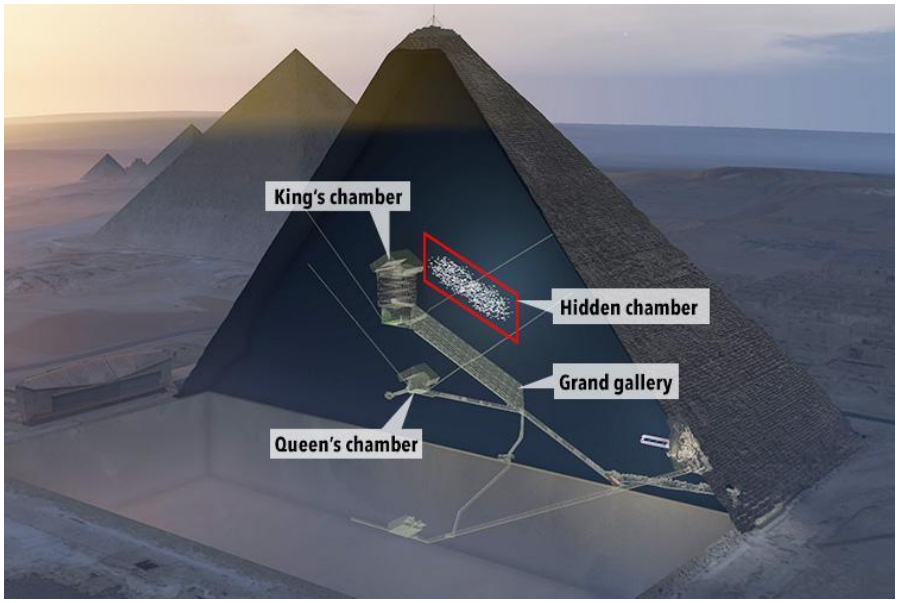
By the science and technology correspondent Lewis Enterkin

Habitable Planets

Artist's illustration of one of the TRAPPIST-1 planets. Photo courtesy of NASA.

On the 22nd of February, a solar system with a central star named TRAPPIST-1 was discovered 39 light years away. TRAPPIST-1 is a red dwarf star only the size of Jupiter, orbited by 7 planets around the size of Earth. What makes this discovery important is that these 7 planets can harbour life, as they all fall under the 'Goldilocks Zone' of planets. This means that they are the distance away from their star to be not too hot, not too cold, but just the right temperature to allow life to thrive and for water, the building block of life as we know it, to be in a liquid state. The planets are too far away to be studied in detail, so we don't know anything about the surface. However, any planet in the Goldilocks Zone is viable, at some point, to have life introduced. Even Earth started out as a dry, rocky and lifeless planet before a meteor shower carrying water and bacteria hit, introducing the most basic form of life. In short, it is very possible for intelligent life to develop, but it may take a very long time.

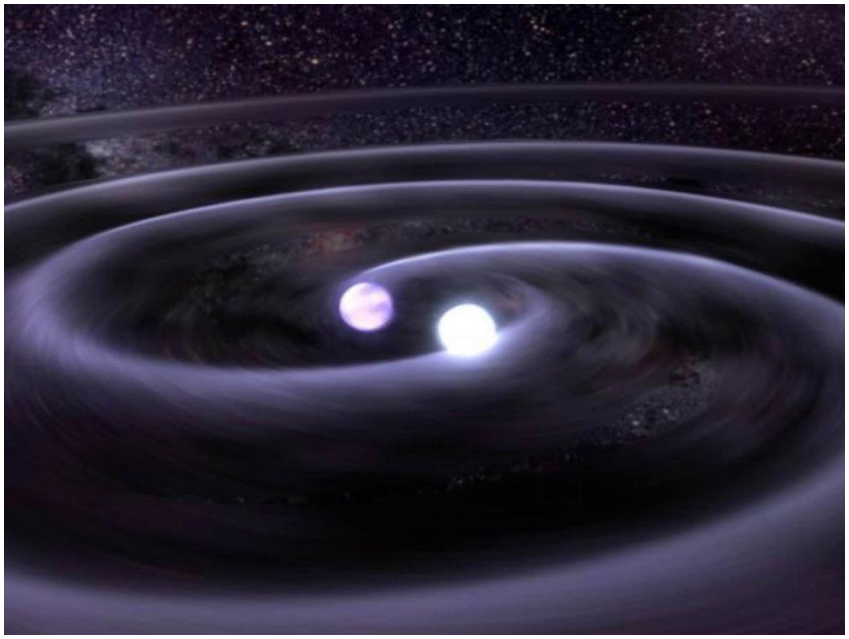
The Great Pyramids



Cross-section of the Great Pyramid of Giza, showing where the hidden chamber is. Photo courtesy of The Sun.

In early November, scientists used a scanner that used rays called muons to find a secret hidden chamber in the Great Pyramid of Giza. Muon detectors are a new form of scanning technology which uses the by-products of cosmic rays. When scientists used these on the Great Pyramid, they noticed that the muons moved faster in a certain area, which meant that it wasn't solid stone, rather a hidden chamber. It is 30 meters long and is above the Grand Gallery, but the tilt of the chamber is still unclear, either parallel to the Grand Gallery or the ground. Egyptologists (experts on ancient Egypt) have ruled out the idea of it being a burial chamber, but other than that, theories of what the chamber is for are varied. Some think it was to take weight off of the Grand Gallery, some think it leads to an entirely new area, and the most complex theory says it is part of a counterweight system, using the slope to make pulleys that made building easier. Overall, the chamber is still shrouded in mystery, and it is possible that even more secret chambers are undiscovered and holding secrets that could completely change our view of Ancient Egypt.

Colliding Stars



Artist's recreation of 2 colliding neutron stars and the gravitational waves they create. Photo courtesy of Wired.

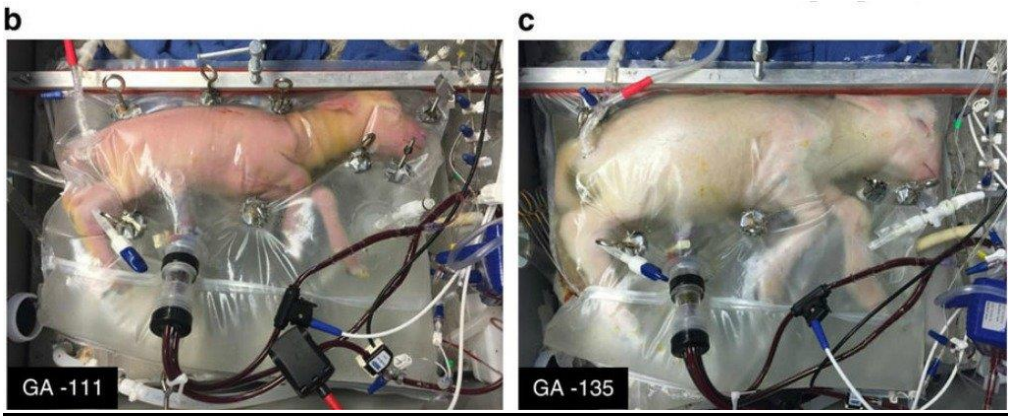
On the 16th of October, gravitational wave sensors picked up a huge disturbance, which happened to be 2 neutron stars colliding. The fusion reaction of these stars was so big, it produced 50 Earth masses of silver, 500 Earth masses of platinum, and 100 Earth masses of gold. To put it another way, the gold alone would cost $100,000,000,000,000,000,000,000,000,000. As mentioned earlier, it also created gravitational waves, a phenomenon Einstein predicted in his theory of general relativity. These waves are described as ripples in spacetime and are only detectable when massive cosmic events like colliding stars or black holes happen. The gold, platinum and silver were created in what is called a fusion reaction. This happens in the cores of stars, where it is so hot and dense that the building blocks of atoms (protons, neutrons and electrons) are fused together into elements. Normal stars usually make simple elements like carbon, and supernovae (star explosions) create heavier elements up to iron. To make very heavy elements like gold, colliding stars and hypernovae are needed. It is also important to note that the colliding stars scientist detected collided thousands of millions of years ago, with the gravitational waves reaching us only now.

Recyclable Rocket

Boosters of the Falcon 9 rocket land back down, ready to be reused. Photo courtesy of Gizmodo.

On 15th of December, Elon Musk's company SpaceX revolutionized space travel with a recyclable rocket. Before this was introduced, the boosters of rockets were ejected from the rocket into the ocean when they ran out of fuel, never to be seen again. However, SpaceX's new recyclable rocket has now been successfully tested. When the Falcon 9 rocket was launched, the boosters acted as usual until, when they were low on fuel, made a controlled descent and landed in the exact same spot as it did when it took off. This is not the first display of SpaceX's talent of controlled rocket landing, as they also managed to land a rocket on a small barge in the middle of the ocean earlier. This recyclable booster will save $18 million per launch and will be a lot less wasteful when it comes to production and materials.

Artificial Womb



Development of lamb foetus while being incubated in the artificial womb. Photo courtesy of ScienceAlert.

In late April, scientists developed and tested an artificial womb by developing a premature lamb foetus. The experiment was a huge success, with the lamb developing healthily, even growing fur and opening its eyes in its late stages of development. This technological breakthrough will save lives in the future, but it is still some distance away from being ready for human testing. However, when it is perfected, this will save all premature babies born as early as 23 weeks in. A premature baby is a baby born before it is fully developed. This can severely affect the baby's health in later life, with sight, bone, neural, and other physical deformities likely, if it even survives until adulthood.

CRISPR and Gene Editing

Artist's recreation of DNA, with a letter being eliminated. Photo courtesy of Healthline.

The long-term project of gene editing is making significant progress and breakthroughs. Gene editing is a technology in progress which will allow doctors to change your DNA, the code that makes you who you are, by replacing or removing certain strands or even letters. A recent addition to this technology is CRISPR, which stands for Clustered Regularly Interspaced Short Palindromic Repeats. To put that in simple terms, it takes advantage of a self-defence mechanism in some bacteria, which allows it to edit its own genetics to make it resistant to different medications. This will allow doctors in the future to edit genetic (inherited) diseases and cancers out of developing babies. It has also taken a step into growing human organs for transplant, as scientists have recently made a sheep embryo that is 0.01% human. However, gene editing is the source of a moral controversy. Some people see editing their children as morally incorrect or unethical, with the term 'designer baby' gathering a following. Many pupils in our school think that "It's fine to edit out a disease or disability, but to make cosmetic changes is to not accept the way your child is, which should not be allowed."

This article is in memorial of Stephen Hawking, whose brilliant mind and wit will never leave this world.