



SCIENCE REMINISCE

Bygone Scientific Extravaganza 2019

As 2019 has come to an end, we look back on an era stuffed heavily with ground breaking discoveries. In the past 10 years, scientists around the world had made remarkable progress towards understanding the human body, our planet, and the cosmos that surrounds us. 2019 has been a great year for science with innumerable scientific discoveries and passing of milestones. We've put our heads together to identify the trends and milestones that we found especially noteworthy, and that we think will set the stage for more amazing discoveries in the decade to come. Through this tabloid, we unveil before you the most significant breakthroughs in 2019.



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JANUARY

Compiled by
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3 January

- First soft landing on Moon by CNSA with its Chang'e 4 mission

4 January

- Way to change the polarisation of light, leading to transistors with less energy loss and heat dissipation

6 January

- Partial solar eclipse visible at East Asia and North Pacific

8 January

- New way to stabilise the 'tearing modes' in fusion reactors using radio waves

9 January

- First SD card with a storage capacity of 1 TB by Lexar, a Chinese company

10 January

- Very powerful astronomical explosion called AT2018cow, observed for the first time

11 January

- New approach to 3D printing, up to 100 times faster than conventional processes, demonstrated

21 January

- Total lunar eclipse observed in America

23 January

- First-ever detection of glycolonitrile, a possible building block of life, in outer space

24 January

- Discovery of the oldest known Earth rock on the Moon by NASA
- Existence of Opportunity rover on Mars for the past 15 years



29 January

- New process to turn plastic waste in hydrocarbon fuels

31 January

- New 3D printer to transform a viscous liquid into complex solid objects

FEBRUARY

Compiled by
Sruthi M.



1 February

- Mars Curiosity rover determined the density of Mount Sharp in Gale crater for the first time

3 February

- Iridium, attached to albumin, found to create a photosensitized molecule to destroy cancer cells

6 February

- 2018 confirmed to be the fourth hottest year on record globally at 0.83 degrees Celsius

13 February

- Mars rover Opportunity declared to end its mission, after failing to respond to repeated transmitted wake-up signals

18 February

- A British woman became the first person in the world to have gene therapy for

age-related macular degeneration (AMD)

21 February

- New form of DNA named Hachimoji DNA, composed of four natural and four unnatural nucleobases



- Beresheet lander, world's first privately financed mission to the Moon, was launched

- Discovery of FarFarOut, the most distant object in the Solar System

25 February

- First microSD card with a storage capacity of 1 terabyte

26 February

- Method of using a liquid metal catalyst to turn carbon dioxide gas back into coal

28 February

- Creation of mice with infrared vision, using nanoparticles injected into their eyes

MARCH

Compiled by
Moncy T.



3 March

- The SpaceX Dragon spacecraft achieved successful autonomous docking with the International Space Station

7 March

- New optical imaging system to enable the discovery of tiny tumours

11 March

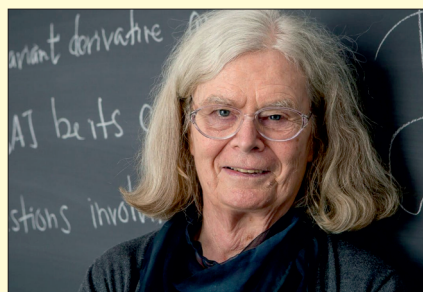
- Cell nuclei from woolly mammoth remains found to show biological activity when transplanted into mouse cells

13 March

- Most powerful laser system ever made with a peak power of 10 Petawatts

19 March

- Karen Uhlenbeck became the first woman to receive the Abel Prize in Mathematics

**20 March**

- Discovery of *Avimaia schweitzerae*, the first fossil bird found with an unlaidd egg that lived about 115 million years ago in Northwest China

27 March

- Life-forms from Earth reported to survive 18 months living in outer space outside the International Space Station (ISS)

APRIL

Compiled by
Smrithy A.S.

**1 April**

- Presence of methane confirmed on Mars through Curiosity rover

4 April

- Animated images of solar eclipses by Deimos and Phobos, the two moons of Mars, released

10 April

- First-ever image of a black hole, located 54 million light years away in the centre of the M87 galaxy, released

**11 April**

- Israeli Beresheet lander crashed after a technical glitch

17 April

- Helium hydride, a primordial molecule, detected for the first time in outer space

23 April

- Mars InSight lander detected its first Marsquake on planet Mars

24 April

- XENON dark matter project announced the observation of radioactive decay of xenon-124, which has a half-life of 1.8 sextillion years

29 April

- Detection of ionized molecules of buckminsterfullerene (C_{60}) in the interstellar medium spaces between the stars

MAY

Compiled by
Sandhya S.R.

**1 May**

- Deleting the ATDC gene found to prevent the growth of pancreatic cancer in mice

3 May

- First generation of usable electricity from americium reported

8 May

- Isabelle Holdaway (17), reported to be the first patient to receive a genetically modified phage therapy to treat a drug-resistant infection

11 May

- Atmospheric CO_2 , found to have reached 415 parts per million (ppm), the highest level for 2.5 million years

14 May

- Plastic pollution, found to harm the oxygen production of *Prochlorococcus*, which is responsible for 10% of oxygen breathed by humans

15 May

- Creation of a new synthetic form of viable life, a variant of the bacteria *Escherichia coli*

20 May

- Redefinition of the SI system of measurement came into effect

**21 May**

- Discovery of an efficient method to store vaccines in temperatures of up to $40^\circ C$ for weeks at a time

22 May

- Superconductivity reported at very high pressure and at a temperature of $-23^\circ C$ which is about 50 degrees more compared to the previous values

23 May

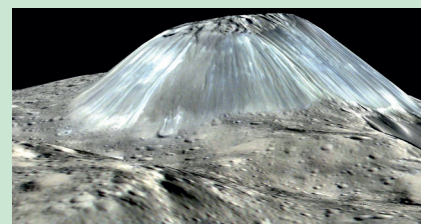
- Discovery of a very large amount of water in the northern polar region of Mars

JUNE

Compiled by
Neelima Raj

**10 June**

- Ahuna Mons, a very high dome-shaped mountain on the dwarf planet Ceres, reported to be formed by a plume of mud ejected from deep within the planet

**11 June**

- Nanobio-hybrid organisms found capable of using airborne carbon dioxide and nitrogen to produce a variety of eco-friendly plastics and fuels

19 June

- First non-invasive mind-controlled robotic arm demonstrated

20 June

- New electronic memory device, using hundreds of times less energy while recording or deleting data, defined

22 June

- Detection of a significant amount of methane in Mars reported

24 June

- SpaceX successfully launched the Falcon Heavy for the 3rd time with the STP-2 mission

27 June

- NASA's Dragonfly spacecraft selected to become the fourth mission in the New Frontiers program, which will launch in 2026, arriving on the surface of Saturn's moon Titan in 2034

JULY

Compiled by
Biji J.

**1 July**

- Oumuamua, an interstellar object that passed through the Solar System in October 2017, reported to be of purely natural origin

2 July

- Total solar eclipse with totality visible in the South Pacific and South America

3 July

- New way found to direct stem cells to heart tissue, using a designer adhesive protein

7 July

- First pictures received from the satellite Light Sail 2, which was launched into Earth orbit on 25 June 2019

8 July

- New method to determine Hubble constant reported

11 July

- Detection of a moon-forming circumplanetary disk around a distant planet for the first time

12 July

- Capturing an image of quantum entanglement reported for the first time

13 July

- Successfully launched Spektr-RG into space, on a seven-year mission to study X-ray sources

15 July

- Role of silica aerogel to make Mars more hospitable for human survival was explained

16 July

- Hubble Constant, based on Red Giant Stars method, determined as $69.8 \text{ km s}^{-1} \text{ Mpc}^{-1}$

22 July

- ISRO launched Chandrayaan-2, its second lunar exploration mission, which includes an orbiter, lander and rover

**31 July**

- GJ 357 d, a "Super-Earth" discovered by NASA's Transiting Exoplanet Survey Satellite (TESS) reported to lie within the 31 light years from Earth
- A star, S5-HVS1, traveling 1,755 km/s faster than any other star detected so far found

AUGUST

Compiled by
Amrutha Sasi

**1 August**

- Most detailed measurements of the warping effect on the Milky Way's 3D structure published
- Details of a new technique for 3D bioprinting of tissue scaffolds made from

collagen, the major structural protein in the human body, published

5 August

- New device using an inexpensive polymer/aluminum film revealed, to cool parts of buildings by up to 11°C , without consuming electricity

6 August

- New form of gold, just two atoms thick, measured at 0.47 nanometres, created

8 August

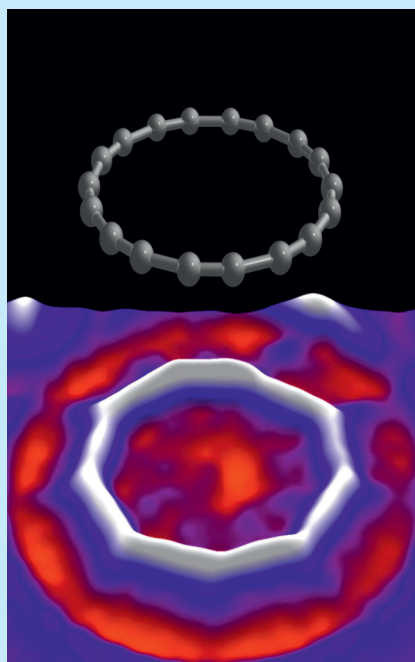
- Magnetospheric Multiscale Mission (MMS) made the first high-resolution measurements of an interplanetary shock wave from the sun

11 August

- Sudden brightening of 'Sagittarius A' reported, which became 75 times brighter than usual, suggesting the encounter of black hole with another object

15 August

- Formation, for the first time, of an 18-atom cyclocarbon of pure carbon; useful as molecular-sized electronic components

**19 August**

- Europa Clipper mission to Europa, a moon of the planet Jupiter, confirmed

23 August

- First teleportation of three-dimensional quantum states, or "qutrits"
- Deep Space Atomic Clock (DSAC), to be used for precise radio navigation in deep space, activated

28 August

- Discovery of a new light wave, named Dyakonov-Voigt wave, that results from a particular manipulation of crystals, first suggested by physicist James Clerk Maxwell

30 August

- Genetic mutation TNPO3, known for causing muscular dystrophy, noted to give protection against HIV

SEPTEMBER

Compiled by
Anisha M.Kumar

**6 September**

- Solution to the last integer left below 100 (i.e. 42) expressed as the sum of three cubes

7 September

- ISRO lost contact with Chandrayaan-2 just moments before it was expected to land on the Moon's surface

11 September

- Detection of water vapour in the atmosphere of the circumstellar habitable zone exoplanet K2-18b, which may be between 0 and 40°C

17 September

- Reversal of cognitive impairment shown in Alzheimer's disease patients, using a wearable head device using electromagnetic waves

19 September

- Facial appearance of Denisovans, an extinct group of archaic humans in the genus Homo reported, based on genetic information

20 September

- InSight lander on Mars uncovered the unexplained magnetic pulses, and magnetic oscillations consistent with the planet-wide reservoir of liquid water deep underground

**25 September**

- Use of machine learning reported to rapidly design dielectric metamaterials that absorb and emit specific frequencies of terahertz radiation

27 September

- Release of cyanide gas and dust from the interstellar comet 2I/Borisov detected

30 September

- Lifespan of fruit flies extended by 48% by combining lithium, trametinib and rapamycin into a single treatment

OCTOBERCompiled by
Aswathy A.Khosh**1 October**

- Amount of carbon held by the Earth quantified as 1.85×10^{18} tonnes

4 October

- New parallelised technique, known as femtosecond projection TPL developed, to 3D print nanoscale structures

8 October

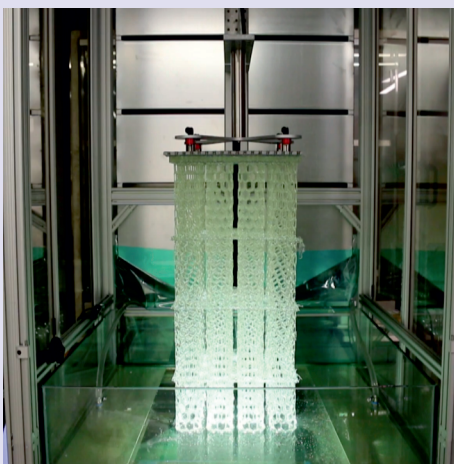
- Mechanism identified for cartilage repair in humans, which could allow joints and possibly entire limbs to regenerate

15 October

- Open AI demonstrated a pair of neural networks trained to solve a Rubik's Cube with a highly dexterous, human-like robotic hand

17 October

- New 3D printer known as HARP (high-area rapid printing) revealed, which can produce an object the size of an adult human within two hours, with quality or resolution

**18 October**

- Use of nanoscale optical probes to monitor neural activity described

23 October

- Quantum supremacy for Google's 53-qubit Sycamore processor performing a specific task in 200 seconds that would take the world's best supercomputers

28 October

- Large asteroid Hygiea observed in higher resolution than ever before, revealing it to be spherical and a likely dwarf planet candidate

29 October

- Rising sea levels revealed to threaten 300 million people by 2050

30 October

- Insect populations found to decline by one-third between 2008 and 2017

NOVEMBERCompiled by
Sherin A.S.**1 November**

- Way to 3D print living skin, complete with blood vessels, demonstrated

6 November

- New technique demonstrated for creating superhydrophobic metals that float on water, using femtosecond laser

13 November

- James Peebles, Michel Mayor and Didier Queloz awarded the 2019 Nobel Prize in Physics



- Serious blood flow and clot problems experienced by astronauts while onboard the International Space Station

18 November

- Titan, the largest moon of Saturn, is fully mapped for the first time
- Sugar molecules detected in meteorites

20 November

- Notable gamma ray burst explosion named GRB 190114C reported, with the highest energy ever observed

25 November

- Levels of greenhouse gases in the atmosphere reported to reach new record high of 407.8 ppm in 2018

27 November

- Discovery of LB-1, the name of a galactic B-type star, as well as the name of a very closely associated over-massive stellar-mass black hole, at least 7,000 light-years from Earth

DECEMBERCompiled by
Parvathy A.Kurup**2 December**

- X-ray Laser-Enhanced Attosecond Pulse generation (XLEAP), a new method for observing the movements of electrons, demonstrated

3 December

- Creation of artificial neurons that reproduce the electrical properties of

biological neurons onto semiconductor chips

4 December

- First evidence of a giant planet orbiting a white dwarf WDJ0914+1914 published, suggesting that planets in our Solar System may survive the death of Sun in distant future

5 December

- Discovery of 71 new plant and animal species reported

8 December

- Star Betelgeuse reported to have significantly faded in visibility, which suggests the star to be in the last stages of its evolution, and expected to explode as a supernova within the next 100,000 years

9 December

- Viscosity of solutions of electrically charged polymers dissolved in water discovered to be influenced by a quantum effect
- First-of-its-kind cryogenic control chip code named Horse Ridge revealed for control of multiple quantum bits (qubits) and scaling of larger quantum computer systems

10 December

- Substantial amounts of "water ice" reported to be readily available just below the surface on Mars

13 December

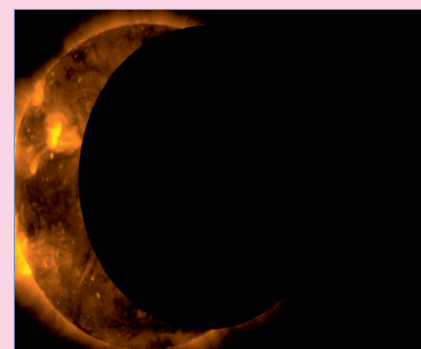
- Japanese government approved construction of the Hyper-Kamiokande, the largest neutrino detector in history

19 December

- Image of a supermassive black hole taken by the Event Horizon Telescope reported as '2019 Breakthrough of the Year' by AAAS Journal

26 December

- Partial solar eclipse occurred

**28 December**

- Christina Koch reported to complete 289 days on International Space Station, more time in space than any other female astronaut

