



SCIENCE REMINISCE

Bygone Scientific Extravaganza 2021

As 2021 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 in the decade to come. Through this

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 2021. In this tabloid, we unveil before you the most significant breakthroughs in 2021.



Editor



Dr. Viji V.

Sub-Editors



Anuvind T. V.



Keerthana S. Raj



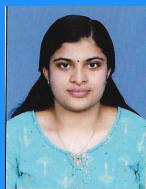
Kallyani M.



Soubhagya M.

JANUARY

Compiled by Anju A.

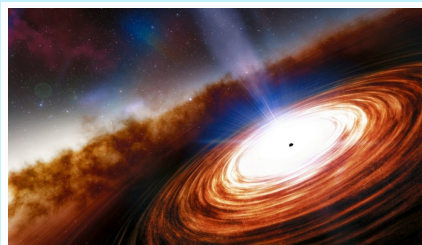


6 January

•Building of the world's largest integrated quantum communication network

8 January

•Discovery of most distant and oldest quasar J0313-1806



12 January

•Detection of significant variant SARS-CoV-2 Lineage P.1

13 January

•First transplant of both arms and shoulders is performed on Icelandic patient

15 January

•Successful transmission of entangled photon between drones

17 January

•Launcher One becomes first successful all liquid fueled air-launched rocket to reach orbit

20 January

•Discovery of myeloid cell as drivers of maladaptive inflammation element of brain ageing in mice

25 January

•Discovery of TOI.178, the rare system of six exoplanet locked in a complex chain of Laplace orbital resonances

28 January

•First detection of SARS-CoV-2 beta variant

FEBRUARY

Compiled by Archana J.



2 February

•Russia's Sputnik V vaccine is shown to be 91.6% effective against symptomatic Covid according to late-stage trial results published in medical journal, The Lancet.

5 February

•A study suggested that climate change may have driven the emergence of SARS-CoV-2 by increasing the growth of forest habitats favored by bats carrying the virus.

8 February

•Scientists reported an updated status of studies considering the possible detection of lifeforms on Venus and Mars.

10 February

•The Chinese Tianwen-1 spacecraft successfully entered orbit around Mars after seven months of transit through the inner solar system.

11 February

•The core of globular cluster NGC 6397 found to contain dense concentration of compact remnants based on new data from the Hubble Space Telescope.

12 February

•Researchers reported that brain organoids created with stem cells into which they reintroduced the archaic gene variant NOVA1 has a major impact on neurodevelopment

15 February

•Scientists reported that the impactor that led to the demise of dinosaurs was a fragment from a disrupted comet, rather than an asteroid

18 February

•NASA's Perseverance rover landed successfully on Mars in a mission for collecting rock and soil samples to discover if there existed any ancient life on Mars.



19 February

•Scientists reported that geomagnetic field fluctuations can affect atmospheric temperature and

cause extinction events with the discovery of a new precisely dated radiocarbon

22 February

•For the first time, Astronomer's released a very high-resolution map of 25,000 active supermassive black holes based on ultra-low radio wavelengths detected by the LOFAR

28 February

•Fragments of a rare carbonaceous chondrite meteorite were recovered and kept for further analysis to get an insight into the early solar system

MARCH

Compiled by

Anjitha R. S.



1 March

•Publishing of NASA -sponsored online workshop TechnoClimes 2020 for the search of technosignature

3 March

•Demonstration of a bioinspired self-powered soft robot for deep-sea operation at the Mariana Trench

5 March

•Naming of the landing site of the Perseverance rover in Jezero crater as "Octavia E. Butler Landing" by NASA

8 March

•Discovery of a quasar known as P172+18, the most distant source of radio emissions

9 March

•Possibility of traversable microscopic wormholes reported
Using of novel lipid nanoparticles to deliver CRISPR

10 March

•New microscopic technique using hyperbolic metamaterial shown to boost imaging resolutions from 200nm down to 40nm

15 March

•Discovery of new bacteria species named *Methylobacterium ajmalii*
•Evidence that the interstellar object 'Oumuamua' is a piece of a planet similar to Pluto
•First detection of an odderon based on the data from CERN's Large Hadron Collider

24 March

•Using Event Horizon Telescope, first polarized-based image of a black hole, at the centre of Messier 87



29 March

•Announcement of first plasma with newly upgraded fusion reactor, the ST40, by Tokamak Energy

30 March

•Evidence of subglacial sediment stored since 1966

31 March

•Demonstration of the first high BW, wireless brain- computer interface
•Presentation of the first 3D atomic imaging of an amorphous solid

APRIL

Compiled by

Sruthi Samban



1 April

•Detection of two strong quakes originating in a location of Mars called Cerberus Fossae by NASA's InSight lander
•Observation of a new phase in Bose-Einstein condensate of light particles by physicists

5 April

•Discovery of a property in Si/GaN that contributes to its highly efficiency and stable performance in converting light and water into carbon-free hydrogen\

6 April

•Detection of Gamma-ray emission from the supernova remnant G272.2-3.2

7 April

•Development of a biosensor to observe all major biomolecule classes of the nanoworld without disturbing them, using nanotechnology, metasurfaces, infrared light and artificial intelligence.

8 April

•Identification of a type of graphene system where electrons freeze as the temperature rises.

9 April

•Description of a new gene editing technology called CRISPRoff to control gene expression with high specificity, leaving the sequence of the DNA unchanged

12 April

•Creation of light waves that can penetrate even opaque materials
•Discovery of three liquid phases in aerosol particles

14 April

•Reporting of supermassive black hole M87* by astronomers, the first and the only black hole to be imaged

15 April

•Realization of the first multi-node quantum network, connecting three quantum processors

16 April

Discovery of a super-Earth orbiting the star GJ 740, a red dwarf star situated some 36 light years from the Earth

MAY

Compiled by

Satheesha S. R.



4 May

•Publishing of NASA -sponsored online workshop TechnoClimes 2020 for the search of technosignature

6 May

•China's CO2 emissions found to surpass that of all OECD countries combined for the first time in 2019
•Bees trained successfully to detect COVID-19 infections via samples

10 May

•Description of a pan-coronavirus mRNA nanoparticle vaccine with activity against all major SARS-CoV-2 variants

11 May

•Development of 3 cost-effective ventilators, oxygen concentrator by ISRO

18 May

•Development of portable and eco-friendly mobile cremation system by IIT Ropar

18 May

- Development of the most powerful Supercomputer "Simorgh" by Iran



25 May

- Demonstration of a "dry transfer technique" enabling the precise positioning of optical-quality carbon nanotubes, without the need for a solvent, by scientists at Japan's RIKEN institute

27 May

- NASA partners ISRO to develop Earth System Observatory

28 May

- Development of a new classification system for cell nuclei and a way of transmuting one cell type into another by biologists

29 May

- New, more contagious, form of the COVID-19 virus, a mixture of the variants first detected in India and Britain, reported by medical scientists in Vietnam

30 May

- Publishing of the most comprehensive 3D map of the human brain- of a 1 mm³ sized millionth of a brain and requiring 1.4 petabytes of storage space

JUNE

Compiled by
Sneha B.



7 June

- Detection of substantial amounts of methane, a possible sign of microbial life, on Enceladus, a moon of the planet Saturn

8 June

- Quantum communications over optical fibres exceeding 600 km in length, a new world record distance

9 June

- Development of quantum nonlinear light microscopy with higher sensitivity and beyond the biological photodamage limit

10 June

- Plant proteins-based biodegradable packaging alternative to plastic molecularly similar to high-strength spider silk

11 June

- DNA polymerases, long thought to only transcribe DNA into DNA or RNA, can also write RNA segments into DNA

16 June

- Great Dimming of Betelgeuse, a red supergiant star, resulted from expulsion of a substantial amount of dust from the star, and not a sign of its destruction

17 June

- Quantum Computing Demonstrator, that fits inside two 19-inch racks, found to be world's first quality standards-meeting compact quantum computer



30 June

- Reporting of the smallest and most massive white dwarf ever seen

JULY

Compiled by

Krishna S.Suresh



3 July

- Licence for Hyderabad-based pharma player Laurus Labs from DRDO for manufacturing and marketing COVID-19 drug 2-Deoxy-D-Glucose (2-DG) in India

13 July

- Organisation of a national-level hackathon named 'SAMVEDAN 2021 – Sensing Solutions for Bharat' by IIT Madras Pravartak Technologies Foundation (IITM-PTF)

16 July

- Development of 'COVIHOME'- India's first Rapid electronic COVID-19 RNA Test kit that allows self-testing at home

19 July

- Development of an Artificial Intelligence-based Mathematical Model called NB Driver to identify cancer-causing alterations in cell

20 July

- Development of a first-of-its-kind Oxygen Rationing Device called AMLEX, to save the oxygen which otherwise gets wasted unnecessarily



26 July

- Astronomers uncovered evidence of water vapour in the atmosphere of Jupiter's moon Ganymede for the first time

AUGUST

Compiled by

Sruthy Prathap



11 August

- ISRO's information that countdown for launch of Geosynchronous satellite launching vehicle F10EOS-03 mission has started

13 August

- Pakistan test fires surface to surface nuclear capable ballistic missile called Ghaznavi
- Discovery of water molecules on moon by Chandrayaan 2 orbiter

14 August

- Four more sites in India added to Ramsar list, giving it to the status of "wetlands of international importance"
- Diksha Shinde, a 14-year-old girl in Aurangabad, was selected as a panellist on Minority Serving Institution (MSI) fellowships virtual panel of NASA

24 August

- “Announcement of Opportunity” by ISRO to analyse Chandrayaan 2 orbiter data
- Evidence of solar driven changes traced on moon

25 August

- Successful testing of Fatah-1, a multi launch rocket system by Pakistan, which equips the military with the capability to strike deep into enemy territory background



27 August

- Stockholm World Water Week held online from Aug 23 to 27 organized by SIWI

SEPTEMBER

Compiled by

Aiswarya Devi A.



1 September

- NASA reports the successful sampling of a rock on Mars, named "Rochette", after a less successful first attempt

2 September

- Observation of a new class of supernova triggered by a black hole or neutron star crashing into the core of a companion star reported by astronomers

3 September

- Autoantibodies against one's own ACE2 enzymes (the major entry point receptors for COVID-19), autoimmune disease, reported to be a main cause of long COVID

8 September

- Cysteamine, an antioxidant drug already approved for human use, shown to reverse atherosclerosis, the process responsible for heart attacks and strokes, in mice

10 September

- Publishing of the first scientific framework version that enables the evaluation of levels of protection of marine protected areas that can serve as a guide for improving, planning and monitoring marine protection

15 September

- Physicists report candidate dark energy particles, Sun-produced local environment-adjusted "chameleon particles", at the dark matter detector XENON1T experiment

17 September

- Scientists report that harmful algal blooms, linked to deforestation, global warming and soil erosion, are proliferating in lakes and rivers around the globe

22 September

- Astronomers report the discovery of a nearby spherical structure, a 'superbubble', on the edges of which giant molecular clouds (Perseus and Taurus) with regions of star formation are being formed, the Per-Tau Shell

23 September

- Scientists report the discovery of human footprints in the state of New Mexico that are understood to be ~23,000 years old, around the time of the last Ice Age

- Researchers report the world's first artificial synthesis of starch

27 September

- Launching of Landsat 9, world's most important satellite, by NASA to study the Earth and its environment



28 September

- Reporting of the development of machine learning models for genome-based early detection and prioritization of high-risk potential zoonotic viruses in animals

OCTOBER

Compiled by

Akhila P. Chand



1 October

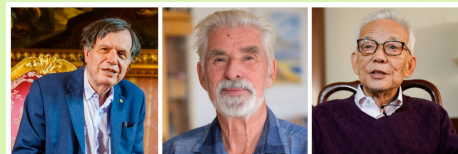
- Clinical trials reported that molnupiravir substantially reduced the risk of hospitalization and death from COVID-19

4 October

- The 2021 Nobel Prize in Medicine was awarded to David Julius and Ardem Patapoutian for their discoveries of receptors for temperature and touch

5 October

- The 2021 Nobel Prize in Physics was awarded to Syukuro Manabe, Klaus Hasselmann and Giorgio Parisi, whose work laid foundation of our knowledge of the earth climate and how humanity influences it



6 October

- The 2021 Nobel Prize in Chemistry was awarded to Benjamin List and David W.C. MacMillan for their work in creating a tool to build molecules, that may be useful for studies on developing new drugs and reducing the effect of chemicals on the environment.
- Endorsement of the first malaria vaccine by World Health Organization

8 October

- Description of a new eco-friendly way of extracting and separating rare earth elements using a bacteria-derived protein called lanmodulin

11 October

- Launching of the pilot project of the world's first automated, driverless and substantially more energy efficient train in the city of Hamburg, Germany

13 October

- Detection of hundreds of Fast Radio Bursts (FRBs) from a single system

16 October

- Launching of the spacecraft by NASA, the first mission to explore the Trojan asteroids

20 October

•Astronomers report the first evidence of a giant impact between two exoplanets, which occurred in the HD 172555 system, based on analysis of gas and dust concentrations.

28 October

•Scientists discover that up to about 20,000 metric tons of microplastics may be stored in coral skeletons worldwide every year.

NOVEMBER

Compiled by

Athira G.

**1 November**

•Detection of organic molecules, including benzoic acid, ammonia and other related unknown compounds, on the planet Mars by the Curiosity rover

9 November

•Discovery of unexplained blockage of high-energy cosmic rays entering the Galactic center, such as a strong magnetic field

11 November

•Discovery of a black hole in NGC 1850 by viewing its influence on the motion of a star in close proximity, the first direct dynamical detection of a black hole in a young massive cluster

•Reporting of the first-ever simulation of baryons on a quantum computer

•Identification of a long filament of cold, dense gas connecting two of the Milky Way's spiral arms, the first known observation of such a galactic structure in the Milky Way

16 November

•Reporting of one of the first super computational approaches for the development of new antibiotic derivatives against antimicrobial resistance

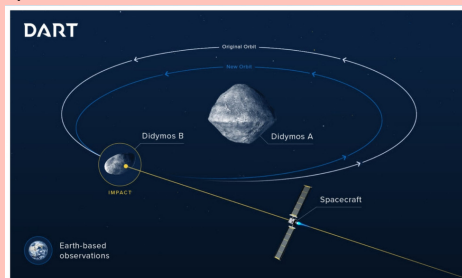
•IBM reveals a new 127 quantum bit processor named 'Eagle', which is the most powerful quantum processor ever made

22 November

•Detection of a quantum effect that blocks atoms by scientists

24 November

•Launching of the Double Asteroid Redirection Test (DART) by NASA, the first attempt to deflect an asteroid for the purpose of learning how to protect Earth

**29 November**

•Reporting of a new form of biological reproduction in xenobots that are made up of and are emersed in frog cells

DECEMBER

Compiled by

Arya A.

**1 December**

•Development of an energy system model for 100% renewable energy, examining feasibility and grid stability

2 December

•Announcement of a stem cell-based treatment for type 1 diabetes

3 December

•Demonstration that grown brain cells integrated into digital systems can carry out goal-directed tasks with performance-scores

4 December

•Occurrence of a total solar eclipse in the Antarctic region

5 December

•Researchers report the development of a system of machine learning and hyper spectral camera that can distinguish between 12 different types of plastics

9 December

•Launching of the Imaging X-ray Polarimetry Explorer, a collaboration between NASA and the Italian Space Agency, by SpaceX

10 December

•Demonstration of a vaccine in mice by researchers from Japan to remove senescent cells, a key driver of the aging process

14 December

•Imaging of Sagittarius A*, the supermassive black hole at the centre of the Milky Way, with 20 times greater detail than ever before, by astronomers using the GRAVITY instrument on the Very Large Telescope in Chile

20 December

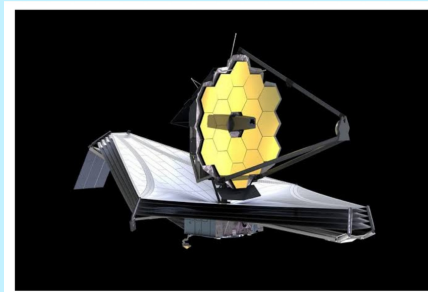
•Reporting of the first known magnetosphere around an exoplanet, surrounding the hot Neptune HAT-P-11b

22 December

•Announcement of a key step in the development of a quantum computer using photons, which eliminates the need for an ultra-cold environment used to cool existing machines

25 December

•Successful launching of the James Webb Space Telescope, "NASA's most powerful and complex space telescope" and successor to the Hubble Space Telescope

**25 December**

•Relaasing of a third convergent graphical shell and UI framework, based on KDE/Kirigami, for the GNU/Linux operating system on phones, desktops and other devices

30 December

•Development of DNA-based "nanoantennas" that attach to proteins and produce a signal via fluorescence

LAYOUT & DESIGN

Anuvind T. V.

GLIMPSES OF THE SCIENCE DAY CELEBRATIONS 2021

