



# SCIENCE REMINISCE

REFLECTING ON THE WONDERS OF DISCOVERY 2023

28 February 2024

## Bygone Scientific Extravaganza 2023

As 2023 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.

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 tabloid, we unveil before you the most significant breakthroughs in 2023.

Editor



Dr. Viji V.

Sub-Editors



Anjana M. S.



Nithin V. L.



Sayoojya Jose



Farzana Nishad

## JANUARY

Compiled by  
Anchana P. Nair



### 3 January

Researchers report molecular mechanisms that has health benefits of periods of intermittent fasting: changes to gene expression

### 4 January

A metascience study delivers various insights and theories about the growth, practices, and changes of science.

### 5 January

Archaeologists report that notational signs from ~37,000 years ago in caves, apparently conveying calendrical meaning about the behaviour of animal species drawn next to them, are the first known (proto-)writing in history.

### 6 January

News outlets report on a brief meta-analysis (21 Dec 2022) that confirms gas stoves are a major risk factor for asthma.

### 09 January

A study suggests that (South Asian) tropical forests are carbon sources for at least a decade .

### 10 January

A second potentially Earth-like planet in the TOI 700 system is reported using data from NASA's Transiting Exoplanet Survey Satellite (TESS).

### 11 January

Teleportation of energy is demonstrated for the first time by researchers using an IBM quantum computer.

### 16 January

Researchers for the first time demonstrate redirection of lightning with lasers.

### 17 January

A metagenomic analysis provides data and insights into microbial sharing between individuals.

### 23 January

A geophysical study reports that the spin of the Earth's inner core has stopped spinning faster than the planet's surface and likely is now rotating slower than it.

### 30 January

Climate scientists predict, using artificial intelligence, that global warming will exceed 1.5 °C in the next decade.

## FEBRUARY

Compiled by  
Sharu Shibu



### 1 February

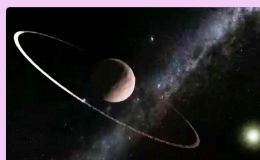
An article examines a solution Using Newtonian mechanics to confirm Leonardo's "equivalence principle"

### 6 February

Astronomers announce the discovery of an additional 12 moons of Jupiter.

### 8 February

The dwarf planet Quaoar is found to have a ring system.

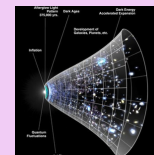


### 14 February

Researchers report a potential first pharmacological acute contraception for men, 100% effective in tests with mice

### 15 February

Cosmologists report results that suggest black holes are the astrophysical origin of dark energy.



### 16 February

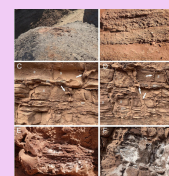
An effective new method for carbon dioxide removal from the ocean is described.

### 18 February

Researchers report the development of a biocomposite 3D printing BactoInk, containing calcium carbonate producing microorganisms which used for restoration

### 21 February

Scientists report the findings of a "dark microbiome" of micro organisms in the Atacama Desert in Chile



### 23 February

The world's first COVID-19 drug ( ISM3312) designed by generative AI is approved for human use

### 28 February

Scientists coin and outline a new field called 'organoid intelligence' (OI).

## MARCH

Compiled by  
Reshma R. G.



### 8 March

A new way of capturing carbon, which transforms the gas into bicarbonate of soda and stores it safely in seawater, is shown to be three times more efficient than existing methods.



### 9 March

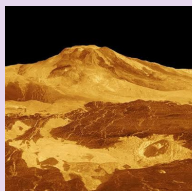
Researchers report the development of a fuel cell implant powered by blood glucose. It can also release insulin at certain levels

### 13 March

An analysis concludes there is large potential (~9,400 TWh/yr) for floating solar photovoltaics on reservoirs, at the upper range of the prior 2020 study.

### 14 March

The first clear evidence of active volcanism on Venus is presented, based on a reanalysis of old images from the Magellan spacecraft.



### 15 March

The structure of olfactory receptor protein OR51E2 is found, the first elucidation of the structure of any human olfactory receptor to date.

### 21 March

Analysis of samples from the near-Earth asteroid Ryugu reveals the presence of uracil, one of the four nucleobases in RNA needed for life.

### 28 March

A new viable lithium-ion battery recycling method is reported.

### 29 March

Astronomers identify an "ultramassive" black hole, one of the largest ever discovered, and the first to be confirmed through gravitational lensing, at the centre of the galaxy Abell 1201 BCG.

### 30 March

A study of the deep ocean currents around Antarctica finds they could slow by 40% by 2050, with significant implications for the global climate.

## APRIL

Compiled by  
Swathi Kurup S.



### 3 April

An unexplained rise of emissions of five chlorofluorocarbons (CFCs), successfully banned by the Montreal Protocol of 1989, is reported. Their climate impact in 2020 is roughly equivalent to that of the CO<sub>2</sub>e from Denmark in 2018.

### 5 April

- The NOAA reports that greenhouse gases continued to increase rapidly in 2022 and that CO<sub>2</sub> levels in the atmosphere are now the highest in 4.3 million years.

- An umbrella review summarizes scientific results on the extensive health effects of added-sugar foods and makes recommendations such as limiting sugar-sweetened beverages which are "the largest source of added sugars" and developing of policy such as advertising

### 6 April

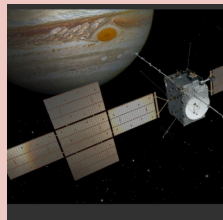
A study shows neurons take up glucose (from food) and metabolize it by glycolysis. There was only limited research on how neurons get their energy in the context of links between glucose metabolism and cognition (brain health and performance).

### 10 April

A study expands upon the role of elites' unsustainable consumption in urban water crises. In Cape Town, for example, the wealthiest 14% of the population use half of the city's water, while the poorest 62% use just a quarter

### 14 April

Jupiter Icy Moons Explorer (JUICE) is launched by the European Space Agency (ESA) to search for life in the Jovian system, with an expected arrival date of 2031.



### 17 April

A new technique for improving the resolution of post-mortem MRI brain scans "by 64 million times" is reported by researchers, who capture the sharpest ever images of an entire mouse brain.

### 21 April

Researchers report the development of neuromorphic AI hardware using nanowires physically mimicking the brain's activity in identifying and remembering an image from memory.

### 25 April

- Astronomers release close-up global images, for the first time, of the Martian moon Deimos that were taken by the Mars Hope orbiter.

- The first review of issues identified in meta-science of metascience is published, providing an overview of ten "questionable" practices (QMPs) in the field such as "overplaying the role of replication in science" and preregistration potential.

### 26 April

- Astronomers present an image, for the first time viewed together, of the shadow of the black hole in the center of the Messier 87 galaxy, and its related high-energy jet

- The first-ever global assessment of glacier mass loss from satellite radar altimetry is published. It shows that glaciers lost 2,720 gigatons of ice, about 2% of their volume, between 2010 and 2020.

### 28 April

ChatGPT is shown to outperform human doctors in responding to online medical questions when measured on quality and empathy by "a team of licensed health care professionals", albeit the chatbot may have previously been trained with these reddit question and answers threads.

## MAY

Compiled by  
Silpa S.



### 1 May

A new brain-reading method for "semantic decoding" is demonstrated. The non-invasive system, based on 16 hours of fMRI data per participant and a transformer, is able to translate a person's neural activity into a continuous stream of text.

**4 May**

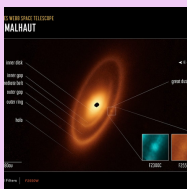
Westinghouse Electric's nuclear division announces the AP300, a miniature version of its signature AP1000 nuclear reactor.

**5 May**

The World Health Organization announces that COVID-19 is no longer considered a global health emergency

**8 May**

The first infrared image of an asteroid belt outside our Solar System is captured by the James Webb Space Telescope. Three distinct rings of debris are shown to exist around Fomalhaut, a young star 25 light years away.

**10 May**

A rough draft of the human "pan-genome" is presented, consisting of 47 genomes from a cohort of genetically diverse individuals. This aims to improve medical research by building on the earlier Human Genome Project.

**11 May**

The discovery of 62 new moons of Saturn is reported, taking its total confirmed number to 145 and overtaking Jupiter.

**16 May**

A software tool called Allegro is reported to accurately simulate 44 million atoms, running on the Perlmutter supercomputer.

**17 May**

Astronomers confirm the existence of MACS1149-JD1 (JD1), one of the farthest known galaxies from Earth.

**29 May**

A new record high efficiency of 19.3% for organic solar cells is reported.

**31 May**

The first X-ray of a single atom is reported.

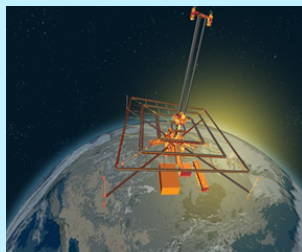
**JUNE**

Compiled by

Shilpa S. Kumar

**1 June**

Caltech reports the first successful beaming of solar energy from space down to a receiver on the ground, via the MAPLE instrument on its SSPD-1 spacecraft.

**2 June**

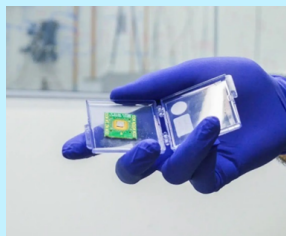
Physicist Lucas Lombriser proposes a controversial alternative way of interpreting the available scientific data which suggests that the notion of an expanding universe may be more a "mirage" than otherwise.

**5 June**

Scientists report potential evidence that Homo naledi, an extinct species of small-brained archaic human discovered in 2013 in South Africa, who lived 500,000 years ago, buried their dead, created art in their caves and used fire.

**6 June**

A team has developed a more energy-efficient, tunable superconducting diode - a promising component for future electronic devices -- that could help scale up quantum computers for industry and improve artificial intelligence systems.

**8 June**

US scientists confirm that the next El Niño has begun, likely resulting in higher global temperatures in late 2023 and into 2024.

**14 June**

- Teams of researchers report creations of synthetic human model embryos from stem cells, without the need for sperm or egg cells, challenging legal, ethical, and biological concepts.
- Astronomers report that the presence of phosphates on Enceladus, a moon of the planet Saturn, has been detected,

**19 June**

The researchers, from the University of Cambridge, developed a solar-powered reactor that converts captured CO2 and plastic waste into sustainable fuels and other valuable chemical products

**21 June**

The first successful transplant of a functional cryopreserved mammalian kidney is reported.

**26 June**

Retatrutide, an experimental drug against obesity, is shown to achieve a more than 24% mean weight reduction in human adults during a Phase 2 trial.

**29 June**

Astronomers report using a new technique to detect, for the first time, the release of neutrinos from the galactic plane of the Milky Way galaxy

**JULY**

Compiled by

Krishna R. Babu

**1 July**

Launch of the ESA space telescope Euclid, beginning a mission to study dark energy and dark matter.

**3 July**

Researchers demonstrate encoding and storing data as DNA without new DNA synthesis, using bacterial DNA via optogenetic circuits.

**5 July**

Harvard astronomer Avi Loeb reports the possibility of the Galileo Project expedition finding the first interstellar material.

**10 July**

Dynamic shell formation is demonstrated experimentally for the first time, potentially impacting fusion energy production.

**11 July**

Three possible "dark star" candidates are reported based on analysis of observations by the James Webb Space Telescope.

**12 July**

Astronomers report considerable success of the James Webb Space Telescope (JWST) after its first year of operations.

**14 July**

The ISRO successfully launches its Chandrayaan-3 spacecraft towards the Moon.





**18 July**

The first example of naturally occurring graphene is reported, offering insights into materials science and nanotechnology.

**19 July**

Researchers report the discovery of self-healing of fatigue cracks in metals in a vacuum.

**24 July**

The first detection of water in the terrestrial region of a disk already known to host two or more protoplanets is announced.

**25 July**

A controversial study finds that a collapse of the AMOC is highly likely this century, and may occur as early as 2025.

**26 July**

DARPA, in collaboration with NASA, begins work on the first in-orbit demonstration of a nuclear thermal rocket engine

**27 July**

The longest known cryptobiosis in a nematode is reported after 46,000 years in Siberian permafrost

**AUGUST**

Compiled by  
Shaincy S. Baby

**3 August**

Dogxim, the now-dead first known hybrid of a fox discovered in the wild in Brazil in 2021, is reported.

**8 August**

A study shows activating astrocyte cells in mice makes them stay awake.

**10 August**

Scientists at Fermilab report the most precise measurement yet of the magnetic moment of the muon.

**14 August**

Researchers report the first-ever image of quantum entanglement.

**17 August**

Scientists publish the first study both investigating climate-polluting investments and proposing taxation as transformative revenue for climate finance.

**23 August**

India's Chandrayaan-3 becomes the first spacecraft to land near the south pole of the Moon, where frozen water is believed to exist.

**30 August**

Autonomous drones win first races against human champions of FPV drone.

**31 August**

Researchers report, based on genetic studies, that a human ancestor population bottleneck occurred around 930,000 and 813,000 years ago

**SEPTEMBER**

Compiled by  
Akshaya M. R.

**2 September**

Sep 2 .India's first solar mission, Aditya -L1 was launched on 2nd September 2023.

**5 September**

Astronomers identify a vast, bubble-like structure known as Ho'oleilana in the distribution of relatively nearby galaxies.

**14 September**

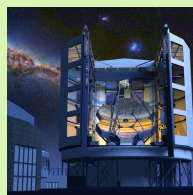
NASA releases its first public study on UAP .

**27 September**

Physicists report studies, for the first time, supporting the notion that antimatter particles behave in a similar way as normal matter in a gravitational field.

**29 September**

Work begins on the seventh and final primary mirror of the Giant Magellan Telescope.

**OCTOBER**

Compiled by  
Gopika M. P.

**2 October**

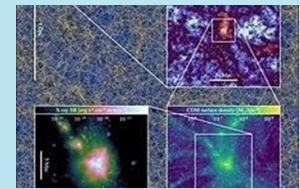
Katalin Karikó and Drew Weissman shared the Nobel Prize in Physiology or Medicine for their work in developing mRNA vaccines,

**3 October**

Pierre Agostini, Ferenc Krausz and Anne L'Huillier share the Nobel Prize in Physics for illuminating how electrons move, and related techniques that permit scientists to capture the motions of subatomic particles moving at extremely fast speeds.

**4 October**

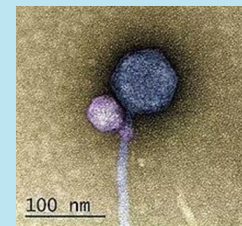
Moungi G. Bawendi, Louis E. Brus and Alexei I. Ekimov share the Nobel Prize in Chemistry for the discovery and development of quantum dot nanoparticles.

**13 October**

NASA launches its Psyche mission to visit the large metallic asteroid 16 Psych.

**14 October**

The Joint European Torus nuclear fusion laboratory conducts its final experiments after 40 years in operation.

**16 October**

21 species in the United States are declared extinct by the US Fish and Wildlife Service. These are one mammal, ten birds, two fish, and eight mussels.



24 October

- NASA provides updated details of its Nancy Grace Roman Space Telescope, planned for launch by 2027.
- JT-60SA, the world's largest fusion reactor, located in Japan, achieves first plasma.

25 October

Scientists, helped by information derived from the Mars Insight lander, report that the planet Mars has a radioactive magma ocean under its crust.

28 October

Scientists, helped by information derived from the Mars Insight lander, report that the planet Mars has a radioactive magma ocean under its crust.

30 October

A study finds that the world's remaining carbon budget for 1.5 °C of global warming is only half that of previous estimates, at less than 250 gigatonnes of carbon dioxide, or around six years of annual worldwide emissions.

31 October

- The first discovery of a virus, phage Mini Flayer, that attaches to another helper virus is reported.
- The coalition of research organizations and science funders behind Plan S publishes a proposal for moving scholarly communication towards open science practices that are more transparent, accessible, efficient and without author fees.

NOVEMBER

Compiled by  
Akhila A. L.



1 November

Amid an ongoing boom in artificial intelligence, the UK hosts the world's

5 November

A new record high efficiency of 33.9% is reported for a silicon-perovskite tandem solar cell. This also surpasses the Shockley-Quieser theoretical limit of 33.7% of single junction solar cells for the first time.

15 November

Scientists report, for the first time, evidence that groups of primates, particularly bonobos, are capable of cooperating with each other.

17 November

The global average temperature temporarily exceeds 2°C above the pre-industrial average for the first time in recorded history.

22 November

An autonomous excavator is demonstrated by researchers at ETH Zurich. Using sensors, the machine can generate 3D maps of a construction site, localising individual blocks and stones in order to build a wall.

23 November

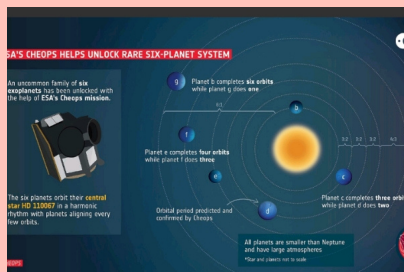
Astrophysicists report the detection of "Amaterasu", the second highest-energy cosmic ray ever known, second only to the Oh-My-God particle of 1991. Amaterasu originated from the Local Void and its energy exceeded 240 exa-electron volts (EeV).

26 November

Astronomers find the result of "heavy black hole seed formation from direct collapse", an alternative way of producing a black hole other than the collapse of a dead star.

29 November

Astronomers report the discovery of a star, HD 110067, that contains six sub-Neptune exoplanets with radii ranging from 1.94R<sub>⊕</sub> to 2.85R<sub>⊕</sub>.



The first example of a planet-forming disk beyond our own Milky Way galaxy is reported by astronomers using the Atacama Large Millimetre/ sub-millimetre Array (ALMA) in Chile. The system, designated as HH 1177, is located in the Large Magellanic Cloud, about 160,000 light years away.

DECEMBER

Compiled by  
Arisona Retnakumar



6 December

Scientists, for the first time, reported an area on the Earth, in Puna de Atacama territory of South America, similar to ancient Earth, and similar to Mars during earlier Martian times.

7 December

A gene therapy based on three transcription factors, Oct4, Sox2, and Klf4 (OSK), showed sustained vision recovery in mice affected by glaucoma.

13 December

The smallest known brown dwarf, weighing just three to four times the mass of Jupiter, is discovered in star cluster IC 348 by astronomers using the James Webb Space Telescope

14 December

2023 saw the highest global average surface temperature in recorded history.

16 December

Scientists in the United States claim that machine intelligence is capable of “replicating” without humans for the first time.

20 December

MIT uses deep learning to identify a new class of antibiotic candidates, able to kill methicillin-resistant Staphylococcus aureus (MRSA).

28 December

A new model of the largest neutron stars finds an 80–90% chance that they contain quark-matter cores.

LAYOUT & DESIGN



Akshara V.



Meghna Ramakrishnan

# GLIMPSES OF THE SCIENCE DAY CELEBRATIONS 2023

