Current Affairs - June 2021 to August 2021

Month August 2021 Type Science and Technology

- ***22** Current Affairs were found in **Last Three Months** for Type - **Science and Technology***

Science

1. Andhra Pradesh-born astronaut **Sirisha Bandla** became 2nd Indian-born woman astronaut to fly to space (Kalpana Chawla was first), to take care of researcher's experience on Unity22 mission, aboard 'VSS Unity' of Virgin Galactic, a company founded by British billionaire Richard Branson.
2. Bengaluru based Jawaharlal Nehru Centre For Advanced Scientific Research (JNCASR) has been placed in top 50 institutions worldwide for advances in materials science by *Nature Index*.
   - The list places JNCASR at 23rd position globally in *50 Rising Institutions* list. It includes 18 institutes from China and 12 from US.
   - JNCASR is only Indian institute on list.
3. China announced building first-of-its-kind *molten-salt nuclear reactor,* that will not require water for cooling. It will run on liquid thorium rather than uranium.
   - It will be expected to be safer than traditional reactors, as molten salt cools and solidifies quickly when exposed to air, insulating thorium.
   - Hence, any potential leak would spill much less radiation into the surrounding environment in comparison to leaks from traditional reactors.

4. China officially begun construction of world's first commercial modular small reactor **Linglong One**, at Changjiang Nuclear Power Plant in Hainan Province.
    - Multipurpose small modular reactor (SMR) Linglong One (also called ACP100), was first such SMR which was approved by International Atomic Energy Agency in 2016.
    - ACP100 has generation capacity of 125000 kilowatt hours, extendable up to 1 billion kilowatt hours.
5. China unveiled maglev train which is capable of a top speed of 600 kmph, termed as fastest ground vehicle globally. It uses electro-magnetic force, which makes it levitate above track, with no contact between body and the rail.
6. European Space Agency (ESA) announced new Venus Mission, named *EnVision*, to be launched in 2030. EnVision probe will determine how and why Venus and Earth evolved so differently, even while being in habitable zone to the Sun.
7. European Space Agency launched world's first commercial fully re-programmable satellite, named ***Eutelsat Quantum***. It has been launched from French Guiana, on board an Ariane 5 rocket.
    - Eutelsat Quantum has been developed as world's first reprogrammable commercial satellite under an ESA Partnership Project with satellite operator Eutelsat and manufacturer Airbus.
    - Eutelsat Quantum, unlike convention satellite models that cannot be repurposed once in orbit, works on software-defined technology that offers flexible communications so that it can adapt to the demands of customers and markets in real-time.
8. Finnish Space Exploration Firm Arctic Astronautics will Launch world's first wooden satellite into space by end of 2021, named WISA Woodsat. This wooden satellite will help scientists monitor how does wood reacts in the cold, heat, radiation, and the vacuum of space.
9. First-of-its-kind research initiative called **Fund for Industrial Research Engagement (FIRE)** has been launched by Science and Engineering Research Board (SERB), in collaboration with **Intel India.**
    - It will increase research opportunities in space of AI/ML, platform systems, circuits & architecture, Internet of Things (IoT) etc.
    - SERB-FIRE aims at bringing together industry and academia on a common platform to exchange ground-breaking ideas and co-promote innovative research.
10. IISC Resarchers for the first time discovered two species of few electron bubbles in superfluid helium gas, which can serve as a model to study how energy states of electrons and interactions between them influence properties.
    - An electron injected into a superfluid form of helium creates a single electron bubble (SEB) - a cavity that is free of helium atoms and contains only the electron. Shape of bubble depends on the energy state of the electron. There are also MEBs - multiple electron bubbles that contain thousands of electrons.
    - FEBs, on the other hand, are nanometre-sized cavities in liquid helium containing just a handful of free electrons. Studying FEBs can help better understand how some of these properties emerge when a few electrons present in a material interact with each other.

11. IIT Bombay researchers come up with an innovative hydrogen manufacture route which increases its production three times and lowers energy required, which could pave path towards environment-friendly hydrogen fuel at a lower cost.
    - Hydrogen can play critical role in shift towards green economy, as combustion of hydrogen to release energy produces water, making it non-polluting. However, higher costs and time taken to produce it has been main barrier in its large scale commercial production.
    - New IIT Bombay research involves electrolysis of water in presence of an external magnetic field. In this, the same system that produces 1 ml of hydrogen gas required 19% lower energy to produce 3 ml of hydrogen in same time, by synergistically coupling electric and magnetic fields at catalytic site.
12. ISRO's second lunar mission Chandrayaan-2 detected presence of water molecules on moon, as per Data from Chandrayaan-2 payload *imaging infrared spectrometre (IIRS)*, which is placed in a 100 km polar orbit.
    - Data from IIRS demonstrates presence of widespread lunar hydration and unambiguous detection of OH and H2O signatures on Moon.
13. India's Inter-University Centre for Astronomy and Astrophysics (IUCAA) is leading *Polar-Areas Stellar-Imaging in Polarisation High-Accuracy Experiment (PASIPHAE)* international collaborative sky surveying project, to study polarisation in light coming from millions of stars.
    - Name is inspired from Pasiphae, the daughter of Greek Sun God Helios.
    - Survey will use two high-tech optical polarimeters to observe the northern and southern skies, simultaneously, with focus on capturing starlight polarisation of very faint stars.
    - By combining data, astronomers will perform magnetic field tomography mapping of interstellar medium of very large areas of sky using WALOP (Wide Area Linear Optical Polarimeter).
14. Indian Oil Corporation will build India' s first *green hydrogen* plant at its Mathura refinery, to prepare for growing demand for cleaner forms of energy.
15. Misc. Science News / Events (August 2021) -
    - Indian Space Research Organisation (ISRO) lost earth observation satellite EOS-03 (Geo-Imaging Satellite (GISAT-1), due to a launch Failure, after GSLV-F10 rocket carrying it malfunctioned about five minutes after lift-off.
    - Agriculture Minister Narendra Singh Tomar inaugurated world’s second-largest refurbished National Gene Bank at National Bureau of Plant Genetic Resources, Pusa in New Delhi.
    - Swedish green steel venture HYBRIT (Hydrogen Breakthrough Ironmaking Technology), began delivery of world's first steel that was manufactured without using coal, to its client Volvo.

- IIT Madras developed India's first indigenous motorized wheelchair vehicle named 'NeoBolt', which can be used not only on roads but on uneven terrains also, with maximum speed 25 kmph.
- Researchers from Indian Institute of Astrophysics discovered three supermassive black holes from three galaxies merging together to form a triple active galactic nucleus, a compact region at the center of a newly discovered galaxy that has a much-higher-than-normal luminosity.
  - This indicates that small merging groups are ideal laboratories to detect multiple accreting supermassive black holes.
  - Supermassive black holes are difficult to detect because they do not emit any light. But they can reveal their presence by interacting with their surroundings.

16. Misc. Science News (July 2021) -
    - UN World Meteorological Organization (WMO) confirmed a new record high temperature of **18.3 degrees Celsius** in Antarctica, getting past earlier record of 17.5 degrees Celsius . Antarctica has registered rise of almost 3 degrees Celsius in average temparature, in last 50 years.
    - Jacobabad city in Pakistan's Sindh province recorded world's highest temperature at 52°C. It is located on the Tropic of Cancer, which means that the sun is in close proximity during summers.
    - Hyderabad-based *Grene Robotics* developed India's first indigenous drone defence dome called *Indrajaal*, with capability to protect an area of 1000-2000 sq km against aerial threats by assessing and acting threats such as UAVs and Low- Radar Cross Section (RCS) targets.
    - A rare species of snake, *black-bellied coral snake (Sinomicrurus nigriventer),* has been discovered by Wildlife Institute of India (WII) in Benog Wildlife Sanctuary of Mussoorie. This is an extremely rarely-found and venomous snake.
    - Botanists from Central University of Punjab discovered a new native plant species of moss from Eastern Antarctica, on rocks near Bharati station at Larsemann Hills. Botanists named it *Bryum Bharatiensis*.
    - DBT-National Institute of Biomedical Genomics (NIBMG) created world's first database of genomic variations in oral cancer, named dbGENVOC.
    - Mizoram University researchers discovered a new snake species in a dried-up area of Tuinghaleng river bed, as a new species of Stoliczkia genus and third species of Stoliczkia from India. It has been named *Stoliczkia vanhnuailianai*, in honour of Vanhnuailiana, a famous Mizo warrior.
    - Central University of Punjab Researchers discovered a new native species of moss from continental Antarctica, named *Bryum bharatiensis*, as a tribute to India's Antarctic station Bharati.

- June 19, 2021 marked 40 years of launch of India's First Communication Satellite *Ariane Passenger PayLoad Experiment (APPLE)*, as an experimental communication satellite launched by Ariane-1, from French Guiana.
- ISRO conducted 3rd long-duration hot test (240 seconds) of liquid propellant Vikas Engine for core L110 liquid stage of human-rated GSLV Mk III vehicle, at engine test facility of ISRO Propulsion Complex (IPRC) at Mahendragiri (Tamil Nadu). It was done as part of engine qualification requirements for Gaganyaan Programme.
- IIT Ropar Researcers developed a first-of-its-kind Oxygen Rationing Device - AMLEX , aimed at increasing life of medical oxygen cylinders by 3 fold.
    - It supplies a required volume of oxygen to patient during inhalation and trips when patient exhales CO_2, saving oxygen which otherwise unnecessarily gets wasted.
- IIT Madras Researchers developed an AI based Mathematical Model called 'NBDriver' to identify cancer-causing alterations in cells, to help identify most appropriate treatment strategy for a patient in an approach known as 'precision oncology'.
- Science and Engineering Research Board (DST-SERB) and GE's John F Welch Technology Centre (JFWTC) collaborated to promote synergy between academic institutes, labs and industries for research across energy, healthcare and aviation sectors.
- Argentine Museum of Natural Sciences stated that 150-million years old fossilized skeleton of species named *Burkesuchus mallingrandensis*, which was discovered in Southern Chile in 2014, has been determined to be ancestor of modern crocodile.
- Indian researchers from IISER Kolkata and IIT Kharagpur developed piezoelectric molecular crystals that repair themselves from mechanical damages without need for any external intervention.
    - Piezoelectric crystals are a class of materials that generate electricity when it undergoes a mechanical impact.
    - This may soon make it possible for damaged electronic components, such as in space crafts, to mend themselves.
- IIT Kanpur launched first technology innovation hub to find cyber security solutions for anti-drones technologies, intrusion detection system, block-chain and cyber physical system.
- World's largest star sapphire cluster has been found in Ratnapura (Sri Lanka), and has been named *Serendipity Sapphire*, valued approx 100 Million USD.
- By analysing data from NASA's Hubble Space Telescope, researchers found first evidence of water vapour in atmosphere of Ganymede, Jupiter's largest moon.
- NASA Awarded Elon Musk led SpaceX a $178 million Launch services contract for NASA's first mission focusing on Jupiter's icy moon Europa. The Europa Clipper mission is due for launch in October 2024 on a SpaceX Falcon Heavy rocket.

17. Misc. Science News / Events (June 2021) -

- *Jayanti* became 12th subgenus of cricket identified under genus Arachnomimus Saussure, 1897. It was Found in Kurra caves of Chhattisgarh, and was named after Noted Cave Explorer Jayant Biswas.
- Germany-based HeidelbergCement (world's second-largest cement maker), will turn its Swedish factory in Slite into world's first CO2-neutral cement plant by 2030, via carbon capture technology.
- IIT Ropar developed a device 'Jivan Vayu' which can be used as a substitute of CPAP machine. It is India's first such device which functions even without electricity and is adapted to both kinds of oxygen generation units - O2 cylinders and oxygen pipelines in hospitals.
- China's Experimental Advanced Superconducting Tokamak (EAST) generated a plasma temperature of 126 million Fahrenheit (120 million C) for 101 seconds, also cranking up device to achieve 160 million Celcius for 20 seconds. The previous record for a maintained plasma temperature was 180 million F (100 million C) for 100 seconds.
- Researchers from Telomere-to-Telomere (T2T) consortium sequenced first truly complete human reference genome, which can possibly be largest improvement to human reference genome, since its initial release approx 20 years ago.
    - Celera Genomics and International Human Genome Sequencing, in 2001, published first drafts of human genome and revolutionized genomics.
- Israeli researchers discovered remains belonging to a *new type of early human* who was previously unknown, near city of Ramla.
- A newly discovered spider species from Thane-Kalyan region has been named *Icius Tukarami,* after Tukaram Omble, Mumbai Cop who laid down his life to help capture terrorist Ajmal Kasab during 26/11 terror attacks.

18. NASA's new spacecraft NEA Scout (Near-Earth Asteroid Scout) has reportedly undergone all required tests and has been placed inside Space Launch System (SLS) rocket.
    - NEA Scout will be flying to space on Artemis I, which will be the first uncrewed test flight of SLS rocket and Orion spacecraft. Artemis I is scheduled to be launched in November 2021.
    - NEA Scout is size of a shoebox, that will be propelled by a solar sail measuring 925 sq ft. The camera fitted on the spacecraft will take pictures to help in determining the physical properties of a near-Earth asteroid.
19. National Aeronautics and Space Agency (NASA) announced 2 new scientific missions to Venus between 2028 and 2030, named *DAVINCI+ (Deep Atmosphere Venus Investigation of Noble gases, Chemistry, and Imaging)* and *VERITAS (Venus Emissivity, Radio Science, InSAR, Topography, and Spectroscopy)*.
    - DAVINCI+ will measure composition of dense Venusian atmosphere and will seek to improve understanding of how it evolved. It will also consist of a fly-by spacecraft and an atmospheric descent probe. It will return high-resolution images of unique geological characteristics on Venus called 'tesserae'.

- VERITAS will map surface of Venus from orbit to help determine its geological history and why it was developed so differently from Earth.

20. Researchers discovered new Tardigrade species of genus Stygarctus, naming it as Stygarctus Keralensis, after Kerala state where it was found.
    - Tardigrades are so small that high-end microscopes are required to study them. Commonly called ‘moss piglets’ and ‘water bears’.
21. UN endorsed a multinational project called *Committee on Earth Observation Satellites Coastal Observations, Applications, Services, and Tools (CEOS COAST)*, co-led by ISRO (India) and NOAA (US).
    - It aims to improve accuracy of coastal data on the basis of satellite and land-based observations.
22. World’s first 3D-printed steel pedestrian bridge has been opened on the Oudezijds Achterburgwal canal in Amsterdam (The Netherlands).
    - The bridge has been created by Dutch company MX3D using a 3D printing technique called wire and arc additive manufacturing. The technique combines robotics with welding.

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