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R-Day celebrations conclude as modernity, tradition blend

Rahul Singh

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NEW DELHI: A 1,000-drone display, the grand finale of the Beating Retreat on Saturday and a first at the ceremony, was the highlight of the musical extravaganza that featured a raft of military bands that belted out patriotic tunes and marked the end of Republic Day celebrations.

In a never-seen-before display in India's history, the drone fleets positioned themselves into breathtaking formations to depict the 75th year of India's Independence, the 'Make-in-India' lion, the National War Memorial, Mahatma Gandhi's contribution, a rotating globe, a map of India and the Tricolour.

President Ram Nath Kovind, Prime Minister Narendra Modi, defence minister Rajnath Singh, army chief General Manoj Mukund Naravane, Indian Air Force chief Air Chief Marshal Vivek Ram Chaudhari and navy chief Admiral R Hari Kumar were among those who attended the ceremony.

The 10-minute drone show was organised by a startup, Botlab Dynamics, supported by the Indian Institute of Technology, Delhi and the department of science and technology (DST). Only the US, Russia and China have the capability to put together a show with 1,000 drones.

The show marked the culmination of six years of hard work, said Dr Sarita Ahlawat, one of the three co-founders of Botlab Dynamics and a 3-D imaging expert with advanced degrees from the US.

"The whole country is talking about the show. I think it's a celebration of technology and what it can do. The project was possible because of the unwavering support from IIT, Delhi and DST. I also hope it draws the attention of policy makers so that we can further strengthen our capabilities on the hardware and technology side and achieve more," she said.

For the first time, the show was made a part of Beating



The North and South blocks stand illuminated during the Beating Retreat ceremony at Raisina Hills in New Delhi on Saturday. AP



A drone formation paying tribute to Mahatma Gandhi at the ceremony in New Delhi on Saturday. SANJEEV VERMA/HT

Retreat to commemorate 75 years of Independence, being celebrated as Azadi Ka Amrit Mahotsav, defence ministry said in a statement.

The demonstration of the indigenous swarm drone technology came at a time when the armed forces are looking at exploiting the capability to carry out offensive missions in enemy

territory, with loitering munitions being developed to meet a key military requirement and keep soldiers out of harm's way.

The whole world watched as India demonstrated its drone swarm technologies. It's a big leap as we are working on developing drones for offensive roles. Such drones may carry small payloads but they can over-



Indian armed forces' bands perform at the ceremony in New Delhi on Saturday. SANJEEV VERMA/HT

whelm the enemy's air defences and hit multiple targets," said Air Marshal Anil Chopra (retd), who heads the Centre for Air Power Studies.

Chopra said it was the "grandest" Beating Retreat ceremony he had ever seen.

Abide With Me, a decades-old staple tune at Beating Retreat and said to be a Mahatma Gan-

dhi's favourite, was dropped from the musical lineup, a move that drew criticism from some quarters in the run-up to the ceremony.

The 26 performances included Kadam Kadam Badhaye Ja, Ae Mere Watan Ke Logon and Hind Ki Sena. Military buglers played the iconic patriotic song Sare Jahan Se Acha in the end.



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Beating Retreat: drones, new tunes enthral viewers

The event celebrated 75 years of India's Independence

MUNEEF KHAN
NEW DELHI

The annual Beating the Retreat ceremony witnessed a series of firsts at Vijay Chowk on Saturday.

The event celebrated 75 years of India's Independence through a series of projection mapping over the walls of the North and South Blocks, while 1,000 drones flew over the historic venue, dotting the sky with multiple colours.

With buglers heralding the arrival of President and Supreme Commander of the Armed Forces Ram Nath Kovind at the venue, the ceremony kicked off with unfurling of the Tricolour and the massed bands playing the 'Veer Sainik' tune.

A total of 44 buglers, 16 trumpeters and 75 drummers enthralled the audience at the ceremony.

Prime Minister Narendra Modi, Defence Minister Rajnath Singh, Chief of Army Staff General M.M. Naravane, Air Force Chief Air Marshal V.R. Chaudhari and Navy Chief Admiral R. Hari Kumar were among the dignitaries present at the ceremony.

Commander Vijay Charles D'Cruz was the principal



Tri Services Band performing during the Beating the Retreat ceremony in New Delhi on Saturday. • R.V. MOORTHY

conductor at this year's ceremony during which the atmosphere was filled with foot-tapping tunes performed by the Pipes and Drums band, followed by bands of the Indian Army, Navy, Air Force and Central Armed Police Forces.

Row over dropped hymn
New tunes were also added to this year's BRT ceremony, including 'Kerala', 'Hind ki Sena' and 'Ae Mere Watan Ke Logon'. Written by Kavi Pradeep, 'Ae Mere Watan Ke Logon' was added as a replacement to the popular 19th century hymn 'Abide With Me' – not played for the first time in over seven decades, a move which was

widely criticised by Opposition leaders.

Illuminating the sky with colours and music in synchrony, the drone show, conceptualised under the 'Make in India' initiative, left the audience in awe. It was organised by a startup – Botlab Dynamics – and supported by IIT-Delhi's Department of Science and Technology.

A century-old military tradition, the Beating the Retreat ceremony dates back to when troops would disengage from the battle at sunset when buglers sounded the retreat. Saturday's ceremony marked the end of India's 73rd Republic Day celebrations that started on January 23.



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NM-ICPS innovation hubs help tackle challenges thrown by Covid-19 pandemic

One AI-driven platform helped X-ray interpretation of images sent over WhatsApp

PNS ■ NEW DELHI

Twenty-five innovation hubs set up across the country through the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS) are churning out best technologies in various sectors, including the health sector to do their bit in tackling challenges thrown by Covid-19 pandemic.

For instance, ARTPARK at IISc Bangalore has developed an AI-driven platform that helps Chest X-ray interpretation of images sent over WhatsApp brought early intervention through rapid screening of Covid-19, aiding doctors who have no access to X-ray machines. Similarly, a team of scientists from IIT Bombay has developed a tapestry method for screening Covid-19 under Remedial Action, Knowledge Skimming, and Holistic Analysis of Covid-19 (RAKSHAK), an effort supported by the Technology Innovation Hub (TIH) at IIT Jodhpur.

According to an official from the Union Ministry of Science and Technology, the ARTPARK has a solution called XraySetu which is quick and easy to use and can work with low-resolution images sent via mobiles, facilitating detection in rural areas. "Using machine learning algorithms, it generates a patient report showing suspicious abnormal regions in the lungs and detects if the person is likely positive for Covid, pneumonia, or other lung abnormalities," he said.

Similarly, RAKSHAK which has been shortlisted by X-prize in an open Innovation Track has led to the develop-

ment of a New Chest X-ray based Covid diagnosis System (in the ICMR validation process now), Open Data for Indian and International Covid cases - COVBASE (Imaging, clinical parameters, longitudinal data, and annotations), Campus RAKSHAK - A decision framework for Campus Safety.

On the other hand, AmbiTag, a first-of-its-kind Internet of Things (IoT) device that monitors ambient temperature during the transportation of vaccines, including Covid-19, medicines, blood samples, food and dairy products, meat products, and animal semen, has been developed by researchers at the IIT Ropar Technology Innovation Hub - AWaDH and its startup ScratchNest.

"So far, such devices were being imported by India. The institute is gearing up for its mass production of AmbiTag. The device will be made available to all companies involved in Covid-19 vaccine transportation from production facilities to the last mile vaccination centers in the country at the production cost of Rs 400," said the official.

A consortium launched by IITM Pravartak Technologies Foundation and five other entrepreneurial start-up companies in deep tech and engineering domain have been established under the mission I-STAC.DB - Indian Space Technologies and Applications Consortium Design Bureau.

The NM-ICPS, which fosters technological solutions in health, education, energy, environment, agriculture, strategic cum security, Industry 4.0 is being implemented through 25 Technology Innovation Hubs (TIHs) established in top academic, and national R&D Institutes. It was approved by the Union Cabinet at a total cost of Rs 3660 crores in December 2018. All the hubs are working on developing solutions for people-centric problems.



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Buildings along Rajpath illuminated for Beating the Retreat ceremony in New Delhi. MUKESH AGGARWAL

Drones dazzle at Beating Retreat, Nehru figures among freedom fighters

TRIBUNE NEWS SERVICE

NEW DELHI, JANUARY 29

A novel drone show was one of the major attractions of this year's Beating the Retreat ceremony. The other events were a 'projection' show on the walls of the North Block and South Block that listed out the fight for independence from 1857 to 1947.

The government listed the key freedom fighters and also mentioned Jawaharlal Nehru, besides Mahatma Gandhi, Subhas Chandra Bose, Sardar Patel, Bhagat Singh and several others. In the past, the Congress had accused the government of



A drone show during the event.

deliberately missing out on the role of Nehru.

One thousand drones, each with ability to emit lights of multiple colours, flew in patterns to form the shape of Mahatma Gandhi with his 'lathi', the National War Memorial and even Earth.

The drone show was made part of the ceremony to commemorate 75 years of Independence, being celebrated as 'Azadi ka Amrit Mahotsav'. The show lasted 10 minutes as music played in the background.

President Ram Nath Kovind was the chief guest at Vijay Chowk.

The show was conceptualised, designed, produced and choreographed under the 'Make in India' initiative.

The drone show was organised by a startup supported by IIT-Delhi and the Department of Science and Technology. Beating the Retreat is a centuries-old military tradition.



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Drone show: IIT alumni startup raced against time

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New Delhi: The Indian startup, which will mesmerise the audience at the Beating Retreat ceremony on Saturday with a 1,000-drone light show, took up the challenge to "develop the technology in just six months" after getting financial support from the central government.

Botlab Dynamics, led by IIT alumni, was given an initial seed fund of Rs 1 crore for R&D and, subsequently, Rs 2.5 crore for scale-up and commercialisation by the science & technology ministry's technology development board for the first-of-its-kind technological project in the country.

Union S&T minister Jitendra Singh, who met the engineers and team members of Botlab at his residence on Friday, said India would become the fourth country after China, Russia and the UK to carry out such a large-scale show. Singh said he was proud that the technology was developed within the country and all necessary components, both hardware and software such as flight controller, precision GPS, motor controller and ground control station algorithms, were indigenous.

The minister said Botlab, in association with the defence ministry, had conceptualised the novel show to commemorate the 75th year of Independence. The 10-minute show, he said, will showcase government achievements through creative formations



Sanjeev Rastogi

LIGHT AND SOUND: A 1,000-drone light show is set to mesmerise the audience at the Beating Retreat ceremony on Saturday

in the sky. He reiterated the government's commitment to support more such innovative and sustainable startups to fulfil PM Modi's vision of making India a global hub of the startup ecosystem.

Subir Kumar Saha, a professor in the mechanical engineering department of IIT Delhi and project director of its Technology Innovation Hub, told **TOL**, "Till last year, the team members could manage to hold a demo with just 50-100 drones. When the defence ministry came up with the proposal to perform a demo with 1,000 drones for Beating Retreat, the team took up the challenge and is now ready to perform."

Dr Sarita Ahlawat, co-founder and MD of Botlab, said the project, "Design and Development of a Reconfigurable Swarming System Consisting of 500-1,000 Drones for 3D

Choreographed Drone Light Shows", could become successful only due to the full financial support of the department as the private sector was reluctant to hand-hold the startup. She also thanked project engineers for letting go lucrative MNC offers and owning up the idea.

In 2016, Botlab Dynamics was incorporated at IIT's technology business incubator unit. Till now, it has provided eight drones to Delhi Police, sold a heavy-lift system to Indian Agriculture Research Institute, and held drone demos for the Indian Army.



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Drone show: IIT alumni startup raced against time

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New Delhi: The Indian start-up, which is set to mesmerise the audience at the Beating Retreat ceremony on Saturday with a drone light show by a swarm of 1,000 drones, came up with the challenge to develop the technology in just six months after getting financial support from the government.

Botlab Dynamics, led by IIT alumni, was given an initial seed fund of Rs1 crore for R&D and subsequently Rs 2.5 crore for scale-up and commercialisation by the science & technology ministry's technology development board to develop the first-of-its-kind technological project in the country.

Union S&T Minister Jitendra Singh, who met the engineers and team members of Botlab at his Delhi residence on Friday, said India will become the fourth country after China, Russia



LIGHT AND SOUND: A 1,000-drone light show is set to mesmerise the audience at the Beating Retreat ceremony on Saturday

and the UK to carry out such a large-scale show with 1,000 drones. He felt proud the technology was developed within the country and comprised indigenous development of all necessary components, including both hardware and software such as the flight controller (brain of the drone), precision GPS, motor controller and ground control station (GCS) algorithms.



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National Girl Child Day: Min interacts with girl achievers in science, tech

PTI ■ NEW DELHI

On the occasion of National Girl Child Day, Union Minister Jitendra Singh on Monday interacted with girls who have excelled in the areas of science, technology and innovation.

Union Science and Technology Minister Singh said several Government schemes are instilling confidence among children to think innovatively, look for out-of-the-box solutions for different problems and to break the barriers of the past to undertake unconventional initiatives.

He stressed upon sustainable start-ups with viable livelihood linkage and new vocational opportunities.

Referring to Prime Minister Narendra Modi's exhortation that "innovation is the key to realising the dream of new India," Singh reiterated

all government support and help to young achievers and said empowerment of girls will lead to a better tomorrow.

During the online interaction, Digantika Bose, first-year B.Sc student from Bengaluru, said that she had developed a virus destroying mask which was preventive against the coronavirus also and the project was shared with the Department of Science & Technology. She sought the minister's help to market the mask, to which he promised her to help undertake an evidence-based trial before its marketing.

Manisha Ramola, first-year B.Sc student from Uttarakhand, has developed an AI-based solution designed to provide in-depth information on medicinal leaves and herbs with just a single image.

The minister complimented her for coming up with an innovation that combined

ancient herbal medicine knowledge of the Himalayas with the futuristic concept of Artificial Intelligence.

Nishi Goswami from Panna in Madhya Pradesh demonstrated to the minister an AI-based Chatbot that provides consultation services like a doctor and answers health or medical queries to a user.

The minister brought to her notice that she had developed an AI-based interface between the patient and doctor. The same could be extended and linked with telemedicine. Vinisha Umashankar from Thiruvannamalai in Tamil Nadu presented her solar ironing cart, while Manya Joshi, Class 12 student from Delhi, initiated a forecasting project for natural disasters.

Anushka Shrivastava, Class 12 student from Bhopal, came up with an eco-friendly water bottle.

TDB-DST supported startup to light up the sky

Union Minister of State (Independent Charge) Science & Technology Dr Jitendra Singh informed that Botlab Dynamics Private Limited, a startup supported by Technology Development Board, under DST and incubated at Indian Institute of Technology, Delhi, will light up the sky with 1000 drones light show at 'Beating the Retreat Ceremony' on January 29.



Dr Singh said that under the leadership of PM Narendra Modi, drone technology has come a long way from delivering vaccines to difficult areas to lighting up the Rajpath during Beating the Retreat Ceremony. He said India will be the fourth country after China, Russia and UK to carry out such a show with 1000 drones. Botlab in association with Ministry of Defence has conceptualized the novel 'Drone Show' to commemorate the 75th year of Independence.



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राजपाल सिंह नरवरिया

मंजिलें और भी हैं

खेती करने के साथ ही मैंने किसानों की जरूरतों को देखते हुए अब तक दो दर्जन से अधिक अविष्कार किए हैं, जिनमें कंबाइन हार्वेस्टर प्रमुख हैं। इस मशीन से किसानों को फसलों की कटाई में 70 फीसदी तक की बचत हो सकती है।

कबाड़ से मशीन बनाकर किसानों की मदद



मैं मध्य प्रदेश के अशोकनगर जिले के जमाखेड़ी गांव का निवासी हूँ। अपने पांच भाई-बहनों में सबसे बड़ा होने के कारण मैंने 2001 में 12वीं के बाद पढ़ाई छोड़ दी और खेती में पिता जी का हाथ बंटाने लगा। हमारे पास 50 बीघा जमीन है, जिस पर हम खेती करते हैं। वर्ष 2003-04 में मेरे चाचा जी की मोटर बोरवेल में गिर गई थी। फिर मैंने लोहे की पत्तियों से एक तेल की कुप्पी जैसा डिजाइन तैयार किया, जिसके ऊपर सकिट लगा था। उसकी मदद से मैंने मोटर निकाल दिया। इसके बाद पूरे क्षेत्र में जहाँ कहीं भी ऐसी घटना होती, लोग मुझे बुलाते थे। फिर एक के बाद एक मैंने खेती से जुड़ी कई मशीनें बनाईं। अब तक मैं व्हील स्पेयर, इको फ्रेंडली प्रो-ट्रे मॉकिंग मशीन से लेकर कंबाइन हार्वेस्टर मशीन बना चुका हूँ, जिससे किसानों को फसलों की कटाई में 70 फीसदी तक की बचत हो सकती है। इसमें एक बार में सात क्विंटल अनाज और पांच क्विंटल भूसा जमा किया जा सकता है। किसानों की बेहतरी के लिए मैं आगे भी काम करने के लिए संकल्पबद्ध हूँ।

(विभिन्न साक्षात्कारों पर आधारित)

कबाड़ से मशीन

छोटे किसानों की समस्याओं को देखते हुए मैंने एक ऐसी मशीन बनाने का विचार किया, जिससे किसानों का काम आसान हो सके। वर्ष 2011 में मैंने कबाड़ (पहले इस्तेमाल किए हुए मशीनों) से मशीन बनाने की शुरुआत की, जो 2016 में बनकर तैयार हुई। इसके लिए मुझे नेशनल इन्वेंशन फाउंडेशन से तीन लाख रुपये का अनुदान भी मिला। मैंने अपने इस डिजाइन को 'ट्रेक्टर ड्रिवेन कंबाइन हार्वेस्टर विद एक्स्ट्रा मेकर' नाम दिया है।

मशीन की खासियत

इस मशीन को ट्रेक्टर से आसानी से अलग किया जा सकता है। इसमें कटाई, थ्रेसिंग के साथ ही पशुओं के चारे को भी काटा जा सकता है। इस मशीन से फसलों की कटाई व भूस बचाने का काम एक साथ किया जा सकता है। इससे किसानों को 70 फीसदी तक की बचत हो सकती है। यह मशीन पर्यावरण को दूषित से भी काफी फायदेमंद है।

मिले कई पुरस्कार

मुझे वर्ष 2017 में राष्ट्रपति के द्वारा नेशनल इन्वेंशन अवॉर्ड मिला। 2019 में मुझे 'जगजीवन राम अभिनव किसान पुरस्कार' से सम्मानित किया गया। मैंने गांव के पास ही 'नरखरिख एग्री इन्वेंशन' नाम से स्टार्ट-अप की शुरुआत की है, जिसके जरिये मैं किसानों की जरूरतों को देखते हुए और अविष्कार करने का काम करूँगा।



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{ BEATING RETREAT }

‘Abide With Me’ left out of lineup

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NEW DELHI: Abide With Me, a decades-old staple tune at the Beating Retreat ceremony and said to be a favourite of Mahatma Gandhi, does not figure in the lineup announced by the government on Saturday for the January 29 musical extravaganza that will feature a raft of military bands marking the end of Republic Day celebrations.

The Christian hymn, composed by Henry Francis Lyte in 1847, finds no mention in an Indian Army handout released on Saturday with details of the ceremony, staged on the eve of Gandhi's death anniversary.

This is the first time the hymn will be dropped. There were plans to not feature it in the ceremony in 2020, although it was restored at the last minute after reports of it being left out led to a controversy. "Soldiers relate to Abide With Me as it has been a part of our military culture. The tradition should continue," said former director general of military operations Lieutenant General Vinod Bhatia.

A defence ministry spokesperson did not comment on why the composition has been omitted, a move that could trigger a fresh political row on the back of the eternal flame



Marching bands from armed forces perform during the Beating the Retreat ceremony on January 29, 2021. AFP

controversy.

The eternal flame, Amar Jawan Jyoti, at India Gate was extinguished on Friday after 50 years and merged with the flame at the adjacent National War Memorial, amid finger pointing over the move aimed at creating a single site for paying homage to India's fallen heroes and conducting all ceremonial functions.

Beating Retreat has traditionally ended with Abide With Me. This year, military buglers will play the iconic patriotic song Sare Jahan Se Acha in the end. The other popular tunes that will be played at the ceremony include Kadam Kadam Badhaye Ja, Ae Mere Watan Ke Logon and Hind Ki Sena.

Beating Retreat will feature

bands from the Indian Army, Indian Air Force, Indian Navy and Central Armed Police Forces, apart from buglers and pipes and drums bands. The ceremony involves the lowering the flags against the backdrop of the setting sun and a simultaneous lighting up of the Rashtrapati Bhawan, South Block, North Block and Parliament House.

A new show with 1,000 drones is expected to add sparkle to Beating Retreat. It is being organised by a startup, Botlab Dynamics, supported by Indian Institute of Technology Delhi and the department of science and technology. Only the US, Russia and China have the capability for a show with 1,000 drones, officials said.

Parade schedule

The government on Saturday also released the schedule of the 73rd Republic Day Parade, India's biggest ceremonial event that is being conducted in the shadow of the third Covid-19 wave and will be witnessed by fewer spectators.

The Indian Army's participation in the 90-minute parade will include a mounted column of 61 Cavalry (one of the world's last remaining horse-mounted regiments), 14 mechanised columns and six marching contingents, apart from Param Vir Chakra and Ashoka Chakra awardees.

The parade will begin at 10.30am, instead of the traditional timing of 10am, for better visibility to the parade and the fly past. The fly past, consisting of 75 aircraft in India's 75th year of Independence, will feature flying formations to commemorate some glorious moments of India's decisive victory over Pakistan in the 1971 war, including the historic Tangail airdrop and the Meghna heli-borne operation. Vintage army equipment to be showcased during the parade includes the Centurion tank that took part in the 1971 India-Pakistan war, OT-62 Topas armoured personnel carrier and the 75/24 Indian field gun, alongside modern tanks, infantry combat vehicles and artillery guns.

आसमान में टिमटिमाएंगे 1000 ड्रोन

इस बार बीटिंग रिट्रीट के अवसर पर 1000 ड्रोन विजय चौक के आसमान में टिमटिमाएंगे। इस दौरान वह आसमान में अनेक फॉर्मेशन बनाएंगे। यह आसमानी परेड पहली बार होगी। भारतीय सेना का एक दल पिछले एक हफ्ते से विजय चौक में ड्रोन उड़ाने की प्रैक्टिस कर रहा है। आजादी के अमृत महोत्सव के मौके पर स्टार्टअप के तहत ड्रोन शो किया जाएगा। रक्षा मंत्रालय और विज्ञान एवं प्रौद्योगिकी मंत्रालय मिलकर इस शो का आयोजन कर रहे हैं। शो का काम दिल्ली की एक स्टार्टअप कंपनी को दिया गया है। ऐसे शो चीन, रूस और ब्रिटेन में होते हैं।

जाते हैं। बैंड बजाते हुए तीनों सेनाओं के ड्रमर, अनेक मनमोहक चाल और फॉर्मेशन करते हैं। यह फॉर्मेशन अनूठा होता है। बीटिंग द रिट्रीट का अर्थ होता है युद्ध की समाप्ति।



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Journalist:	Bureau	Page No:	2

Physicist Tarun Souradeep to head Raman Research Institute

BENGALURU, DHNS: Noted physicist Prof Tarun Souradeep took over as the director of Raman Research Institute (RRI) in Bengaluru on Thursday.

Prof Souradeep, who received his PhD from Pune-based Inter-University Centre for Astronomy and Astrophysics (IUCAA), is also a post-doctoral fellow at the Kansas State University's High Energy Physics Group and the Canadian Institute for Theoretical Astrophysics.

Before his switch to RRI, Prof Souradeep served at IUCAA as a scientist for two decades before moving to the Indian Institute of Science Education and Research (IISER), Pune, as professor and chair of the Physics Department at IISER.

His contributions to Cosmology and Gravitational



Prof Tarun Souradeep

Wave Physics and Astronomy helped India stay on par with the global research on the subjects.

He is also the spokesperson (Science) for LIGO-India and member secretary of LIGO-India Scientific Management Board.

Assuming charge at RRI on Thursday, Prof Souradeep said: "It is an honour to be at the helm of the Raman Research Institute, an institution with rich heritage and a unique scientific legacy."

"It has nurtured a healthy balance of top-end research, together with technological capability that holds great promise for the future frontier endeavour at par with the best in the world."



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Journalist:	Bureau	Page No:	12

India, Lanka extend cooperation on tech & science for 3 yrs

New Delhi: India and Sri Lanka on Thursday extended their existing science & technology cooperation for three more years with focus on new areas like waste-water technologies, biotech, sustainable agriculture, aerospace engineering, robotics, big data analytics and artificial intelligence.

Both countries also reviewed the ongoing collaborative activities in the nine areas spanning food technology, plant-based medicines, meteorology, space research & applications, industrial electronics, renewable energy, waste management, information and communication technology, and discussed their future activities at the India-Sri Lanka 5th Joint Committee on Science and Tech Cooperation, held virtually.

"India and Sri Lanka have a great legacy of intellectual, cultural, and religious interaction and relationship of more than 2500 years old. Trade and investment and cooperation in education and other sectors have gone up in recent times, and in this line, cooperation in S&T becomes very critical," said S K Varshney, advisor and head, International Cooperation, department of science and technology (DST), who led the Indian delegation. [IANS](#)



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Journalist:	Bureau	Page No:	4

Amazon inks agreement with NIF Incubation Council

AMAZON INDIA on Wednesday said it has signed a memorandum of understanding with the NIF Incubation and Entrepreneurship Council (NIFentreC) to accelerate grassroots innovation, local economy and improve livelihoods across rural India.

NIFentreC is a technology business incubator hosted by the National Innovation Foundation (NIF), an autonomous body of the Department of Science and Technology.



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Journalist:	PTI	Page No:	2

Israel discuss widening scope of bilateral industrial R&D and technological innovation fund

PTI ■ NEW DELHI

Experts from India and Israel deliberated on widening the scope of the bilateral Industrial R&D and Technological Innovation Fund (I4F), approved three joint research and development projects worth USD 5.5 million and suggested measures to create a broader collaborative ecosystem between the two countries, the science and technology ministry said on Wednesday. The discussions took place virtually on Tuesday in the presence of officials from the Department of Science and Technology (DST), the Israel Innovation Authority (IIA), GITA and various industries partners. The experts from the two countries deliberated on widening the scope of the India-Israel Industrial R&D and Technological Innovation Fund (I4F) at its eighth governing body meeting. They approved three joint research and development projects worth USD 5.5

million and suggested measures to create a broader India-Israel collaborative ecosystem.

"The I4F programme has a lot of potential. This board meeting will give us new thoughts, new directions on how to go forward," said S Chandrasekhar, Secretary, DST and India Co-Chair, acknowledging the contributions made by Israel in the field of science and technology.

"So far, the priority areas have been agriculture, security and other important areas. There is further scope of increasing the quantum of projects received, which calls for the need to conduct more online meetings amongst the startup ecosystems of Israel and India," he said in a statement. A m i r a m Appelbaum, Co-Chair, Israel and chairman of the board, IIA, said despite the difficult times of the COVID-19 pandemic, it is critical to continue with the efforts of collaboration.

"I4F is one of the examples of collaborations which we want

to carry forward. We look forward to go through interesting applications of projects submitted in this programme," he said. The governing body ratified the minutes of the seventh board meeting, which was followed by giving its approval to the three research and development projects with an overall budget of USD 5.5 million. The projects were "Centrally Monitored IoT Nanosensors for Molecular Diagnostics in Healthcare and Screening Applications", "NoMoreMos - a mosquito control biological solution" and "IoT-enabled satellite communication for real-time collection of agriculture and environment data across India". The members further discussed the status of the ongoing projects under the I4F since 2018. The Israeli side introduced the new I4F website and match-making platform developed as a measure to increase the popularity of the joint programme and presented a list of programmes planned for 2022.



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वरिष्ठ आईएफएस सुनील बने सर्वे ऑफ इंडिया के महासर्वेक्षक

देहरादून। भारतीय वन सेवा के वरिष्ठ अधिकारी एवं केंद्रीय विज्ञान एवं प्रौद्योगिकी विभाग में संयुक्त सर्वेच सुनील कुमार को सर्वे ऑफ इंडिया के महासर्वेक्षक की जिम्मेदारी भी सौंपी गई है। सुनील कुमार ने देहरादून पहुंचकर कार्यभार भी ग्रहण कर लिया है। एजेन्सी



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Journalist:	Chayanika Nigam	Page No:	19

शस्त्रीयत >>

एक लड़की, जिसे गणित से प्यार है



कोलकाता के इंडियन स्टैटिस्टिकल इंस्टीट्यूट में प्रोफेसर नीना गुप्ता को रामानुजन पुरस्कार से सम्मानित किया गया है। उनकी कहानी, साझा कर रही हैं चयनिका निगम

आखीर से गणित नीरस और कठिन दिखने लगा जाता है। लेकिन गणितज्ञ नीना गुप्ता इससे बिल्कुल भी इतनेकाक नहीं रखती। उन्हें हाल ही में 2021 के लिए विकासशील देशों के योग्य मैट्रिक्स का डीपएस्टी-आईसीटी-आईसीटी रामानुजन पुरस्कार मिला है।

दूसरी भारतीय महिला
नीना गुप्ता को मिला ये सम्मान देश के लिए चौथा रामानुजन पुरस्कार है, लेकिन ये पुरस्कार एक और मायने में खास है। दरअसल, दूसरी बार यह पुरस्कार किसी भारतीय महिला को मिला है। भारत को पहला रामानुजन अवार्ड कनाडा की सुनिवर्सिटी में पढ़ाने वाली भारतीय सुजाता समर्थी को साल 2006 में मिला था।

क्यों मिला अवार्ड?
कोलकाता के इंडियन स्टैटिस्टिकल इंस्टीट्यूट में प्रोफेसर नीना गुप्ता जैरिको कैल्कुलेशन प्रॉब्लम को हल करने के लिए जानी जाती हैं। उन्हें रामानुजन अवार्ड पढ़ाने एल्गोरिथम-जोमिटी और कॉम्प्यूटेशनल एल्गोरिथम में विशेष योगदान के लिए मिला है। खासतौर पर एफाइन्ड स्पेस के लिए

जैरिको कैल्कुलेशन प्रॉब्लम का हल खोजने के लिए ये सम्मानित की गई हैं। जैरिको कैल्कुलेशन दुनिया की गणित से जुड़ी सबसे कठिन प्रॉब्लम है।

खुद पर था गर्व
ऐसा नहीं है कि नीना ने जैरिको कैल्कुलेशन प्रॉब्लम पहली बार हल करने को कोशिश की है। उन्होंने 2009 में भी ये कोशिश की थी, तब वह पीएचडी स्टूडेंट थीं। उन्होंने अपने प्रोफेसर के सामने जैरिको कैल्कुलेशन प्रॉब्लम हल करने का प्रस्ताव रखा था। लेकिन तब उनके प्रोफेसर ने इसे समय की बर्बादी बता दिया था। लेकिन नीना मेहनत करती रहीं और 2012 में उन्हें इस समस्या का ग्लोबल सॉल्यूशन मिला भी गया। नीना गुप्ता को 2014 में इंडियन नेशनल साइंस एकेडमी का योग साइंटिस्ट अवार्ड भी मिला चुका है। इसके साथ उन्हें एक और नामी अवार्ड भी मिला चुका है। 2019 में उन्हें शांति स्वरूप भट्टनागर फ़ाउंडेशन साइंस एंड टेक्नोलॉजी से भी सम्मानित किया गया था।

निगमों पित्त से किया वादा
नीना गुप्ता हमेशा से दोनहार रही हैं। उन्होंने

2011 में पीएचडी पूरी की थी। नीना ने अमर्त्य दा के गवर्नमेंट में पीएचडी कले भी अपने हुनर का भरपूर इस्तेमाल किया था। उन्होंने अपने पिता से कहा था कि वो अपने पांच साल में पीएचडी पूरी कर लेंगी। लेकिन उनके पिता को उनकी बात पर विश्वास नहीं था। उन्हें लगातार था कि उनकी दोनहार बेटी ये काम कम समय में कर सकती है। पिता को बात सही साबित हुई और नीना ने कॉम्प्यूटेशनल एल्गोरिथम में अपनी पीएचडी डिफेंड दो साल में पूरी कर ली थी।

खुद की है पढ़ाई
नीना बचपन से ही पढ़ने में अच्छी थीं, यही वजह रही कि उन्होंने खुद पढ़ाई की है। नीना ने कोलकाता के खालसा हाई स्कूल से स्कूल की पढ़ाई की है। इसके बाद गणित में बैचलर ऑफ साइंस की डिग्री उन्होंने मेथुन कॉलेज, कोलकाता से ली। इसके बाद उन्होंने अपनी मास्टर डिग्री और पीएचडी कोलकाता के ही इंडियन स्टैटिस्टिकल इंस्टीट्यूट से पूरी की। अब इसी संस्थान में नीना प्रोफेसर भी हैं।

रामानुजन पुरस्कार क्या है?

रामानुजन पुरस्कार गणित के क्षेत्र में काम करने वाले 45 साल से कम उम्र के गणितज्ञों को ही दिया जाता है। इस पुरस्कार को शुरूआत भारतीय गणितज्ञ श्रीनिवास रामानुजन के नाम पर ही हुई है। इसको इंटरनेशनल सेंटर फॉर थियोरिटिकल फिजिक्स रामानुजन पुरस्कार नाम से भी दिया जाता है। इसे इटली की संस्था अंतरराष्ट्रीय सैद्धांतिक भौतिकी केंद्र को और से गणितज्ञों को दिया जाता है। इस पुरस्कार के लिए फंड अल्बेल फंड से दिया जाता है।

श्रीनिवास रामानुजन को भी जानिए

22 दिसंबर, 1887 को तमिलनाडु के इरोड गांव में जन्मे श्रीनिवास रामानुजन ने बहुत छोटी उम्र में ही गणित में महारत हासिल कर ली थी। उन्होंने संख्या सिद्धांत, गणितीय विश्लेषण और अनंत श्रृंखला जैसे विषयों पर खूब काम किया था। सबसे पहले ऑग्न गणितज्ञ हार्डी ने उनके काम को प्रशंसा की थी। साल 1918 में ट्रिनिटी कॉलेज की फैलोशिप पाने वाले पहले भारतीय भी रामानुजन ही बने। रामानुजन की मृत्यु सिर्फ 32 साल की उम्र में हो गई थी। इतरों पहले तो कई कमल कर गए थे, उसे उन्होंने 4000 से भी ज्यादा ऐसी व्योम पर भी गोप किया, जिसे आज तक कोई समझ नहीं पाया था।

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शोध

चाय और केले के छिलके से बनेगा चारकोल

जनसत्ता संवाद

वैज्ञानिकों ने चाय और केले के छिलके से 'सक्रिय कार्बन' या चारकोल बनाने में सफलता हासिल की है। शोधकर्ताओं ने चाय के कचरे से सक्रिय कार्बन तैयार करने के लिए एक वैकल्पिक सक्रिय एजेंट के रूप में केले के पौधे के अर्क का इस्तेमाल किया है। वैज्ञानिकों के मुताबिक, चाय के प्रसंस्करण से आमतौर पर चाय की धूल के रूप में ढेर सारा कचरा निकलता है। इसे उपयोगी वस्तुओं में बदला जा सकता है।

भारत सरकार के विज्ञान और प्रौद्योगिकी विभाग के 'इंस्टीट्यूट आफ एडवांस्ड स्टडी इन साइंस एंड टेक्नोलॉजी' (आइएसएसटी) गुवाहाटी के शोधकर्ताओं ने यह उपलब्धि हासिल की है। इस नई विकसित प्रक्रिया के उपयोग से सक्रिय कार्बन का संश्लेषण करने के लिए किसी भी विषैले कारक के उपयोग की आवश्यकता नहीं पड़ती। भारतीय वैज्ञानिकों ने चाय और केले के कचरे के उपयोग से गैर-विषैले सक्रिय कार्बन बनाने के लिए एक तकनीक विकसित की है। उनका कहना है कि इस गैर-विषैले सक्रिय कार्बन का उपयोग औद्योगिक प्रदूषण नियंत्रण, जल शोधन, खाद्य तथा पेय प्रसंस्करण और गंध निवारण जैसे उद्देश्यों के लिए किया जा सकता है।

सक्रिय कार्बन, जिसे सक्रिय चारकोल भी कहा जाता है, कार्बन का एक रूप है, जिसमें छोटे, कम मात्रा वाले छिद्र होते हैं, जो अवशोषण या रासायनिक प्रतिक्रियाओं के लिए उपलब्ध सतह क्षेत्र को बढ़ाने के लिए जाने जाते हैं। सक्रिय कार्बन का उपयोग मीथेन और हाइड्रोजन भंडारण, वायु शोधन, डिकैफिनेशन (काफी, कोको, चाय पत्ती और अन्य कैफीन

भारत सरकार के विज्ञान और प्रौद्योगिकी विभाग के 'इंस्टीट्यूट आफ एडवांस्ड स्टडी इन साइंस एंड टेक्नोलॉजी' (आइएसएसटी) गुवाहाटी के द्वारा नई विकसित प्रक्रिया के उपयोग से सक्रिय कार्बन का संश्लेषण करने के लिए किसी भी विषैले कारक के उपयोग की आवश्यकता नहीं पड़ती। भारतीय वैज्ञानिकों ने चाय और केले के कचरे के उपयोग से गैर-विषैले सक्रिय कार्बन बनाने के लिए तकनीक विकसित की है। इस गैर-विषैले सक्रिय कार्बन का उपयोग औद्योगिक प्रदूषण नियंत्रण, जल शोधन, खाद्य तथा पेय प्रसंस्करण और गंध निवारण जैसे उद्देश्यों के लिए किया जा सकता है।



जो घोल मिलता है, उसे खार कहते हैं। केले से निकलने वाले प्राकृतिक खार को 'कोल खार' या 'कोला खार' कहा जाता है। इस अर्क का उपयोग सक्रिय करने वाले एजेंट के रूप में किया गया है। इस अध्ययन से जुड़े शोधकर्ताओं में आइएसएसटी पूर्व निदेशक डा एनसी तालुकदार और एसोसिएट प्रोफेसर डा देवाशोष चौधरी शामिल हैं।

युक्त सामग्री से कैफीन को हटाना), स्वर्ण शोधन, धातु निष्कर्षण, जल शोधन, दवा, सीवेज उपचार, श्वासयंत्र में एअर फिल्टर, संपीडित हवा में फिल्टर, दांतों को सफेद करने, हाइड्रोजन क्लोराइड के उत्पादन में किया जाता है।

शोधकर्ताओं ने चाय के कचरे से सक्रिय कार्बन तैयार करने के लिए एक वैकल्पिक सक्रिय एजेंट के रूप में केले के पौधे के अर्क का इस्तेमाल किया है। इस शोध को लेकर विज्ञान एवं प्रौद्योगिकी मंत्रालय ने अपने बयान में जानकारी दी है कि केले के पौधे के अर्क में मौजूद आक्सीजन के साथ मिलने वाला पोटेशियम यौगिक चाय के कचरे से तैयार कार्बन को सक्रिय करने में मदद करता है। इस प्रक्रिया में उपयोग किए जाने वाले केले के पौधे का अर्क पारंपरिक तरीके से तैयार किया गया है, जिसे खार के नाम से जाना जाता है। यह जले हुए सूखे केले के छिलके की राख से प्राप्त एक क्षारीय अर्क होता है। इसके लिए सबसे पसंदीदा केले को असमी भाषा में 'भीम कोल' कहा जाता है। भीम कोल केले की एक स्वदेशी किस्म है, जो केवल असम और पूर्वोत्तर भारत के कुछ हिस्सों में पाई जाती है।

खार बनाने के लिए सबसे पहले केले का छिलका सुखाया जाता है और फिर राख बनाने के लिए उसे जला दिया जाता है। राख को चूर-चूर करके एक महीन पाउडर बना लिया जाता है। इसके बाद एक साफ सूती कपड़े से राख के चूर्ण से पानी को छान लिया जाता है और अंत में



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विज्ञान एवं प्रौद्योगिकी समाधान के लिए चार सूत्री रणनीति की हिमायत

जनसत्ता ब्यूरो
नई दिल्ली, 5 जनवरी।

केंद्र सरकार ने बुधवार को विषय आधारित परियोजनाओं पर जोर देते हुए विज्ञान एवं प्रौद्योगिकी के प्रति एक समन्वित रुख के लिए चार सूत्री एक रणनीति की हिमायत की है। प्रसवार्ता में केंद्रीय मंत्री जितेंद्र सिंह ने कहा कि राज्यों के समक्ष पेश आ रही समस्याओं के लिए विज्ञान एवं प्रौद्योगिकी आधारित समाधान पर चर्चा करने के लिए विज्ञान एवं प्रौद्योगिकी मंत्रियों की दो दिवसीय बैठक आयोजित करने की योजना है।

उन्होंने कहा कि हम इसे परंपरागत तरीके से नहीं कर रहे हैं, इसे विज्ञान आधारित सम्मेलन विषय आधारित बनाएंगे। विभिन्न क्षेत्रों की जरूरतों के मुताबिक विषय निर्धारित किया जा सकता है। उन्होंने 28 फरवरी को राष्ट्रीय विज्ञान दिवस के लिए सतत भविष्य को लेकर विज्ञान एवं प्रौद्योगिकी में समन्वित रुख थीम का औपचारिक रूप से अनावरण भी किया। विज्ञान दिवस के दौरान नेशनल काउंसिल फॉर साइंस एंड टेक्नोलॉजी कम्युनिकेशन ने व्याख्यान, प्रश्नोत्तरी, ओपन हाउस आदि के आयोजन के लिए विभिन्न विभागों को अनुदान देकर देशभर में विभिन्न कार्यक्रमों का समर्थन किया है।



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Journalist:	Bureau	Page No:	12

TDB helps start-up working on water purification

Union Minister of State (IC) Science & Technology; Minister of State (IC) Earth Sciences; MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, Dr Jitendra Singh launched Artificial Intelligence-driven start-up by IIT alumni for water purification through innovative technology. The facility aims to provide clean drinking water at a price much lesser than the market price. An MoU was also signed between

Technology Development Board (TDB), a statutory body of Department of Science & Technology, Government of India and M/s Swajal Water Private Limited, a tech start-up company focused on innovative technologies to make reliable clean drinking water accessible to communities at affordable price. Dr Jitendra Singh welcomed the financial support extended to Swajal by TDB and said that his ministry is committed to reach out to potential small and viable start-ups having skill and talent pool, but lacking resources.





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STUDENTS BRING LAURELS

Karnal: Six students of Dyal Singh Public School, main branch, brought laurels to the school, district and parents by winning inspire awards 'Manak' being executed by the Department of Science and Technology, Government of India to motivate students by fostering a culture of creativity and innovative thinking among them about science. Dhruvika, Sania and Mansha, students of Class IX received this award for 2022, while in 2021 - Urvi, Manan, Daksh and Mehul got awards. Earlier, in 2019, Bhumi and Brinda bagged this award. Principal Sushma Devgan and headmistress Priya Kapoor congratulated the students.



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Scientists develop durable Braille maps using digital embossing technology

PNS ■ NEW DELHI

Scientists from National Atlas and Thematic Mapping Organisation (NATMO) under the Department of Science & Technology have developed user-friendly long lasting durable Braille maps using advanced technology for visually challenged students in the country.

The digital embossing technology is a technology which eliminates the need for printing plates, moulds, chemicals, and solvents, emitting no pollutants or waste and reduces overall energy usage, said a statement from the DST here.

The maps produced using this technology are not only useful for high-speed produc-



tion of the maps but can also produce Braille Maps that can be used by more people for years together. It has been experienced that the maps produced with earlier technology have lost its readability and feeling experience within a very short span of time, it added.

Initially, NATMO had published Braille Atlas for Visually Impaired (India), edition 2017 in English Braille Script which received huge response from the visually impaired community. It was developed with an indigenous manual embossing method. It was conferred

with the National Award on "Science & Technology Intervention for Physically Challenged" for this publication which was officially released on February 10, 2017.

In continuation, NATMO received unexpected and overwhelming demands for Braille Atlases from different corners, encouraging it to prepare Braille Atlases in Hindi and other regional languages.

With encouragement and support from the Department of Science & Technology, NATMO has developed a Braille Unit with state-of-art cutting edge solutions such as Artificial Intelligence (AI) and spot UV coating methods for Digital Embossing Solution. The complete process under-

goes different stages with end-to-end solutions in digital platforms.

Braille Atlas of India were distributed in 323 schools of India as a proof of concept (PoC). Along with this publication, NATMO also organized Braille Workshops & Quiz Contests to develop awareness among the visually impaired students, teachers and trainers. From 2017 to 2019, a total 1409 students from 97 schools of 22 States & UT participated in the Braille Workshops & Quiz Contests.

The unique Braille Solution Unit will be launched soon with the expectation to fulfil the demands of the larger community at PAN India level, said the statement.



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Journalist:	Chethan Kumar	Page No:	8

Scientists find peculiar star with 'Heartbeat' but devoid of pulsation

Chethan.Kumar@timesgroup.com

Bengaluru: A group of Indian and international scientists has spotted what they've termed a "peculiar binary star that shows heartbeat but no pulsations" contrary to the norm of binary stars sporting both heartbeats as well as pulsations. This star — called HD73619 — is located in a cluster in the Cancer constellation, one of the closest open star clusters to Earth.

A team of 33 scientists, led by Santosh Joshi from Aryabhata Research Institute of Observational Sciences (ARIES), an autonomous institution under the Department of Science & Technology (DST) carried out observations of HD73619 using eight ground-based telescopes located in different parts of the globe.

According to DST, a total of about 180 'heartbeat' stars are known to date. The name 'Heartbeat' stems from the resemblance of the path of the star to an electrocardiogram of the human heart. These are binary star systems where each star travels in a highly elliptical orbit around the common centre of mass, and the distance between the two stars varies drastically as they orbit each other.

"When the stars are at closest passage of binary systems, a sudden increase in integrated brightness with amplitude of the order of several

The name 'Heartbeat' stems from the resemblance of the path of the star to an electrocardiogram of the human heart

parts-per-thousand (ppt) is observed. As the components move apart, the light variation falls and finally becomes flat, indicating that combined flux is reduced, resulting in alternating peaks and troughs in their light curves. The pulsational activity of such stars is due to the oscillations in the component stars when they are at their closest approach," the scientists said.

The scientists have found that the HD73619 is the first member of heartbeat systems in binary chemically peculiar stars that does not show any pulsational/vibrational activity at their closest approach. "Chemically peculiar stars are those stars which have an unusual abundance of elements heavier than hydrogen and helium on the surface. Data also revealed that the newly discovered heartbeat star exhibits either very weak or no magnetic field. Absence of weak magnetic field means that any dark spots on the HD73619 may have different and hitherto unknown origin as compared to sunspots which are created by strong magnetic field," the scientists added.



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Journalist:	Bureau	Page No:	10

वरिष्ठ आईएफएस सुनील बने सर्वे ऑफ इंडिया के महासर्वेक्षक

देहरादून। भारतीय वन सेवा के वरिष्ठ अधिकारी एवं केंद्रीय विज्ञान एवं प्रौद्योगिकी विभाग में संयुक्त सचिव सुनील कुमार को सर्वे ऑफ इंडिया के महासर्वेक्षक की जिम्मेदारी भी सौंपी गई है। सुनील कुमार ने देहरादून पहुंचकर कार्यभार भी ग्रहण कर लिया है। एजेसी



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Journalist:	Akhil Kadidal	Page No:	10

AN UNREAL WORLD?

An experiment that disproves Einstein's idea of reality

AKHIL KADIDAL

Quantum physicists in the city have conducted experiments proving that reality as we think of it may not exist—and in the process have not only conclusively disproved an Einsteinian idea of reality but have also paved the way for more secure information transfer.

That all of this should be achieved by quantum scientists should come as little surprise. Quantum mechanics has already been expanding our concept of what reality is. Previous experiments around the world, for example, have shown that particles can be in more than one place at a time, but a key tenet of quantum theory is that an object only assumes a definite position if it is seen by the observer.

Bothered by this, Albert Einstein famously said, "I like to think that the moon is there even if I am not looking at it."

His statement reflects the everyday believed notion of realism, which



suggests that a system has well-defined properties in any instant, even when not measured. But what if the quirks of quantum physics go beyond mere atoms or particles?

Testing realism

This has prompted a spate of experiments to determine, in the words of *New Scientist*, if "there is a hard boundary between the quantum and classical worlds." Central to this is the Leggett-Garg inequality, devised in 1985 by Anthony Leggett and Anupam Garg. "This inequality looks for correlations between measurements to see whether quantum or classical rules are being followed," the *New Scientist* states. In essence, it is a means of testing realism.

Professor Urbasi Sinha of Raman Research Institute (RRI) explained that the experimental violation of such inequality would not only falsify realism but also would confirm that quantum mechanics is not limited to the micro-world, but can be applied to bigger objects, such as the moon.

"Leggett and Garg realized they could test the quantumness of big objects in theory. Their inequality could tell us whether realism holds true in the everyday world," she said.

She added that, "this could also make way for harnessing non-classicality or quantumness of single photons for technological applications such as secure quantum communications and quantum sensing, which are crucial in today's requirements of secure information transfer."

In recent years, Leggett-Garg experiments carried out on various quantum systems from superconducting fluids and photons to atomic nuclei and tiny crystals have demonstrated that the microscopic world is non-real. For this they have found ways of measuring particles without disturbing it.

Testing the macroscopic limit of quantum mechanics is an important area of research because it can reveal up to what extent quantum principles dominate—revealing the quantum-classical boundary.

However, these experiments have limitations. Scientists worldwide are trying to come up with better technology and appropriately designed strategies for achieving a fully conclusive experimental test.

Now, a team of scientists from RRI has successfully addressed this challenge.

In the course of a two-year experiment, she showed a significant amount of violation of Leggett Garg inequality by studying single photons.

The experiment was performed at the Quantum Information and Computing laboratory of RRI and was led by Urbasi along with her PhD student Kaushik Jorjard. Theoretical contributions from Professor Dipankar Home of the Bose Institute Kolkata and Dr Debasish Saha of the S N Bose Centre for Basic Sciences Kolkata played a significant role in the work.

First experiment

The work, published in *PRX Quantum*, is the first ambiguity-free experiment to show violation of Leggett Garg inequalities.

The team conducted the experiment with single photons (particles of light) and proved the quantumness of the single photon comprehensively. "This is the first experiment that shows the most decisive refutation of the notion of realism by the closure of what are known as 'loopholes' plaguing all relevant experiments to date," Urbasi said.

"Loopholes are elements, such as equipment limitations or study-related factors which can inadvertently alter the experiment or conspire to deviate results," she told DH.

She added that the strategies and technologies developed for the closure of all the existing loopholes will prove to be very useful for harnessing such non-classicality/quantumness of single photons for technological applications in secure quantum communications and quantum sensing.

Moreover, the experiment further shows remarkable agreement with quantum physics predictions. "In our analysis, we have been able to show that not only are we violating the Leggett Garg inequality in a loophole-free manner, but that we were also showing remarkable agreement with the predictions of quantum mechanics," Urbasi said.

This work was partially funded by the Centre of Excellence in quantum technologies grant from the Ministry of Electronics and Information Technology as well as the Quantum Enabled Science and Technology grants from DST.



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SKY WATCH

A year of achievements for Hanle observatory in Ladakh

SPACE

NEW DELHI: With several achievements such as faster method of predicting space weather under its belt under its dome in 2021, the Indian Astronomical Observatory (IAO) located at Hanle near Leh in Ladakh has emerged as one of the promising observatory sites globally.

The obvious advantages of more clear nights, minimal light pollution, background aerosol concentration, extremely dry atmospheric condition and no interruption by mon-

soon are among the reasons that have made the Hanle Observatory a popular and a promising site belonging to Indian Institute of Astrophysics (IIA), Bengaluru.

Among its achievements are: "A faster method of predicting space weather has been identified in a type of solar radio bursts observed using the global network of solar radio telescopes called CALLISTO; a clue to the mystery behind the high abundance of Lithium has been traced. An active galaxy found in a very bright state with 10 times more X-ray emission than



normal, equivalent to more than 10 trillion of the Sun, and located five billion light years

speed of light." An algorithm that can increase the accuracy of data from exoplanets by reducing the contamination by the Earth's atmosphere and the disturbances due to instrumental effects and other factors has been developed while a new method to understand the atmosphere of extrasolar planets has been found.

"Besides, we now have clues to the mystery of solar flares and coronal mass ejections in regions on the Sun with disturbed magnetic fields that can help improve solar weather predictions," said a release.



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Journalist:	Bureau	Page No:	8

जागरण विशेष

होफेरा सोलरसी • इंदौर

गाजर घास से बायो प्लास्टिक बनाने में मिली सफलता



आइआईटी इंदौर के सहयोग से निजी कालेज के प्रोफेसर का शोध, केंद्र ने दी आर्थिक सहायता

1950-55 के बीच भारत आई थी गाजर घास गाजर घास अमेरिकी मूल की वनस्पति है। यह देखने में गाजर के पौधे जैसी होती है। माना जाता है कि वर्ष 1950 से 1955 के बीच इसके बीज भारत पहुंचे। उस समय खाद सकट से जुड़ते हमारे देश ने अमेरिका से गेहूं आयात किया था। इसके साथ गाजर घास के बीज भी देश में आए और तेजी से फैले। इसे बटक वांदनी के नाम से भी पुकारा जाता है। गाजर घास ऐसा खरपतवार है जो मनुष्य में दमा, एलजी, लंबा रोग और खुजली उत्पन्न करता है। इससे फसलों के उत्पादन में भी कमी आती है।

« गाजर घास से बनी बायो प्लास्टिक की फिल्म दिखाते हुए ड. मुकेश कुमार पाटीदार » बड़ौदिया

फसल, मनुष्यों और पशुओं के लिए लंबे समय से परेशानी का कारण रही गाजर घास भविष्य में प्लास्टिक के खतरनाक कचरे से मुक्ति दिलाने में सहायक बन सकती है। गाजर घास से बायो प्लास्टिक बनाने में सफलता मिली है। भारतीय प्रौद्योगिकी संस्थान (आइआईटी) इंदौर के संरक्षण में निजी कालेज के प्रोफेसर डा. मुकेश कुमार पाटीदार व उनके सहयोगी ने यह उपलब्धि हासिल की है। यह बायो प्लास्टिक डेढ़ से दो महीने में प्राकृतिक रूप से नष्ट हो जाती है। बाजार में ताने की तैयारी: यह तकनीक सिद्धांत से आगे बढ़कर अब उपयोग के लिए तैयार किए जाने के स्तर पर है। भारत सरकार के विज्ञान और तकनीक विभाग (डीएसटी) ने प्रोजेक्ट को आगे बढ़ाने के लिए 20 लाख रुपये का अनुदान दिया है। शोधकर्ता प्रवास में हैं कि दो वर्षों में यह बायो प्लास्टिक उपयोग के लिए बाजार में आ सके। अमेरिकी जर्मन में प्रकाशित: महाराजा रणजीत सिंह कालेज आफ प्रोफेशनल स्टडीज के बायोसाइंस विभाग के प्रोफेसर डा. मुकेश कुमार पाटीदार ने गाजर घास (वानस्पतिक नाम पार्थोनियम हिस्टरोसोरेस) से बायो-प्लास्टिक बनाने का काम शुरू किया था। उनकी सफलता की कहानी अमेरिकी जर्नल एनवायरमेंटल केमिकल इंजीनियरिंग में प्रकाशित हो चुकी है। शोधार्थी शायद ही निगम इस परियोजना में सहयोगी हैं। आइआईटी के रसायन विभाग की प्रोफेसर अपूर्वा के, दास बायो प्लास्टिक के रसायनिक परीक्षणों में जुटी हैं।

पारदर्शी और मजबूत: डा. पाटीदार के अनुसार गाजर घास के सेल्यूलोज यानी रेशों से बायो प्लास्टिक बनाने में सफलता मिली है। यह सामान्य प्लास्टिक जैसी ही मजबूत है। इसकी जो फिल्म तैयार हुई है वह पारदर्शी है। खास बात है कि यह नमक और 10 प्रतिशत सल्फ्यूरिक एसिड के घोल में भी बरकरार रहती है। यानी यह खाद्य पदार्थों की पैकिंग में काम आ सकती है। लंबे में यह 45 दिनों में 80 प्रतिशत तक नष्ट भी हो गई। इसका पर्यावरण पर दुष्प्रभाव नहीं है। मौजूदा बायो प्लास्टिक के स्वर्क्षार्थ से इसकी लागत भी आधी होगी।

इस खबर को विस्तार से पढ़ने के लिए स्कैन करें





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STUDENTS BRING LAURELS

Karnal: Six students of Dyal Singh Public School, main branch, brought laurels to the school, district and parents by winning inspire awards 'Manak' being executed by the Department of Science and Technology, Government of India to motivate students by fostering a culture of creativity and innovative thinking among them about science. Dhruvika, Sania and Marsha, students of Class IX received this award for 2022, while in 2021 - Urvi, Manan, Daksh and Mehul got awards. Earlier, in 2019, Bhumi and Brinda bagged this award. Principal Sushma Devgan and headmistress Priya Kapoor congratulated the students.



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Botlab Dynamics to organise 1,000 Drones Light Show

Union Minister of State (IC) Science & Technology, Dr Jitendra Singh said, Botlab Dynamics Pvt Ltd, a start-up supported by Technology Development Board, under DST & incubated at IIT Delhi will light up the sky with 1,000 Drones Light Show at 'Beating the Retreat Ceremony' on January 29. Dr Jitendra Singh said, under leadership of PM Narendra Modi, drone technology has come a long way from delivering vaccines to difficult areas to lighting up Rajpath during Beating the Retreat Ceremony. He said, India will be the 4th country after China, Russia & UK to carry out such a large scale show with 1,000 drones. He added, Botlab in association with Ministry of Defence has conceptualized the novel 'Drone Show' to commemorate 75th year of Independence.



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TDB helps start-up working on water purification

Union Minister of State (IC) Science & Technology; Minister of State (IC) Earth Sciences; MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, Dr Jitendra Singh launched Artificial Intelligence-driven start-up by IIT alumni for water purification through innovative technology. The facility aims to provide clean drinking water at a price much lesser than the market price. An MoU was also signed between

Technology Development Board (TDB), a statutory body of Department of Science & Technology, Government of India and M/s Swajal Water Private Limited, a tech start-up company focused on innovative technologies to make reliable clean drinking water accessible to communities at affordable price. Dr Jitendra Singh welcomed the financial support extended to Swajal by TDB and said that his ministry is committed to reach out to potential small and viable start-ups having skill and talent pool, but lacking resources.



Hindustan Times

GB Nagar: Teen awarded for idea on road safety

Ashni Dhaor

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NOIDA: A student of Class 7 of Junior High School (JHS) in Gautam Budh Nagar's Wazidpur has been selected for the Innovation in Science Pursuit for Inspired Research (INSPIRE) award, conducted by the Department of Science and Technology (DST), for her "unique idea of a wrong-side driving detector", said officials on Tuesday.

The student, Shivani Pal, 13, is the daughter of a vegetable vendor and has been awarded a sum of ₹10,000 to execute the project and present it at the next stage of the competition. The INSPIRE award is one of the flagship programmes of the DST, Government of India, that aims to "foster a culture of creativity and innovative thinking among school children".

"A total of 59 students have been selected from Gautam Budh Nagar, of which 58 are



Shivani Pal (13).

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from private schools and only one from a government school in the district. A disbursement of the INSPIRE Award of ₹10,000 is being transferred to bank accounts of the short-listed students through the Direct Benefit Transfer scheme. These selected students have to present their projects at the District Level Exhibition and Project Competition, to be organised by the District Education Authority," said DK Saxena, basic education officer (BEO) of Gautam Budh Nagar.

In view of the ongoing pandemic, the date for the event has not been decided yet. 1,722 students have been selected for this

competition from the state.

Shivani said, "My parents sell vegetables on the main road outside our village, and we often see accidents on that road because of wrong-side driving. So, I came up with the idea of a wrong-side driving detector, wherein a camera will be installed on the road along with an alarm, which will go off as soon as a vehicle is spotted coming from the wrong side".

On detecting a vehicle coming from the wrong side on the road, the alarm will go off and an alert will be sent to the local traffic police, who will take action against the driver concerned, Shivani added.

Shivani's father, Sudheer Pal, 45, said, "We will save the ₹10,000 given to Shivani for her higher studies... We hope that her dreams come true and she achieves everything she wants." Shivani has two other sisters -- Neelam (18) and Sandhya (8). Her mother, Kanta Devi (39), is also a vegetable vendor.