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Punjab's veterinary college to soon begin its first session

The Punjab government is all set to start the first academic session at the newly-built veterinary college at Rampur Phull in Bathinda district, state minister Balbir Singh Sidhu said.

The motive behind establishing the college is to promote auxiliary occupations of animal husbandry and dairy, besides producing veterinary scientists, he said here.

The session would be started after the approval of the Veterinary Council of India, the Punjab Minister for Animal Husbandry, Dairy Development and Fisheries said.

The college would be affiliated to the Guru Angad Dev Veterinary and Animal Sciences University, he said after a high-level meeting to take stock of the preparedness of his department to commence operation at the college.

During the meeting, the varsity's vice chancellor, A S Nanda, informed the minister that the proposal for the recruitment of teaching and non-teaching staff for the college has already been put before the Punjab government.

Sidhu directed the additional chief secretary of the department, G Vajralingam to personally take up the matter with the finance department and get the sanction for staff recruitment.

Vajralingam said the proposal for the recruitment of 88 veterinary scientist and 165 non-teaching staff, which includes clerks, laboratory technicians and field workers, has been put forwarded by the university.

India to share ocean buoy data: official

In a significant decision, India today announced that it would share data obtained by its ocean buoys, positioned outside the country's exclusive economic zone (EEZ), with others nations without any restrictions.

These buoys, having sensors for lower atmosphere and sub surface observations, are located in the Indian Ocean and help forecast monsoon as well as provide cyclone warnings.

However, data from buoys within the country's EEZ would not be shared due to security reasons, a senior official said.

"It was a kind of policy that we had to withhold the data from these buoys. But now we thought withholding the data may not help us. We are opening up even atmospheric data. It will be given free of cost," M Rajeevan, Secretary, Ministry of Earth Sciences told reporters here today.

He was speaking on the sidelines of the second India-USA colloquium on "Earth Observations and Sciences for Society and Economy".

Rajeevan said data from these buoys situated in international waters would be provided to all countries without any restriction.

"We have restrictions on giving ocean data within our Exclusive Economic Zone because of security reasons but international water data should be freely available," he said.

"The data from RAMA buoy (marooned outside the EEZ) is given to students and researchers free of cost. We thought that it is a good initiative to give this data free to

Daily yoga practice improves sperm quality: AIIMS study

A daily yoga routine significantly improve sperm quality, according to a study conducted by the All India Institute of Medical Sciences (AIIMS).

The study, which was published in Nature Review Urology, an international medical journal, early this year, was conducted by experts in the department of Anatomy at AIIMS in collaboration with the department of Urology and Obstetrics and Gynaecology.

The major cause of defective sperm function is DNA damage. The quality of genetic components

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in sperm are vital for birth of a healthy offspring, said Dr Rima Dada, Professor in-charge of Laboratory of Molecular Reproduction and Genetics, Department of Anatomy at AIIMS.

“Sperm DNA damage is the common underlying cause of idiopathic infertility, idiopathic recurrent spontaneous abortion and congenital malformations. Sperm DNA damage also leads to increased chances of denovo germ line mutations and accumulation of mutagenic bases. This leads to the offspring being at increased risk of genetic and epigenetic disorders and thus adversely affects health trajectory of the offspring,” Dr Dada said.

The major cause of DNA damage is oxidative stress, a condition in which there is imbalance between free radical levels and anti-oxygen capacity in the body.

Of all the cells in the body, the male germ cell is the most vulnerable to oxidative stress.

Smaller cities more successful in implementing waste-segregation policy: CSE

Smaller cities have been innovative and “more successful” in implementing waste segregation at source methodology compared to the bigger ones, a green body today said, as it awarded a small town in Maharashtra for its eco-friendly initiatives.

The Centre for Science and Environment (CSE) has been working with cities to promote and implement source-segregation and decentralised model of waste management.

To advance this work, the CSE had launched ‘Forum of Cities that Segregate’ last December. The forum now has 26 members, including cities like Indore, Thiruvananthapuram, Mysore, Muzaffarpur and some municipal corporations in Delhi-NCR (such as SDMC, EDMC and Gurgaon).

The 2017-18 assessment report of the performance of 20 of these 26 forum cities was released here by the CSE today.

The cities were assessed based on their performance in 2017-18. The parameters included segregation at source, collection, transportation, waste processing, adoption of decentralised systems, inclusion of informal sector and enforcement of solid waste management byelaws and plastic waste management.

Based on the findings of the assessment report, the best performers were selected and the Leaves Awards conferred on them, with Vengurla in Maharashtra receiving the highest ‘Five Leaves Award’, the CSE said in a statement.

Developed MRI scanner that reduces cost by 50%: Tata Trusts

Tata Trusts said its Foundation for Innovation and Social Entrepreneurship (FISE) has developed a high-tech portable MRI scanner that can reduce cost of scanning by 50 per cent.

The 1.5 Tesla whole body Magnetic Resonance Imaging (MRI) scanner has been developed at a total investment of Rs 15 crore by a team of eight scientists and engineers.

“Today, depending on which facility it is, the cost of an MRI scan can be around Rs 8,000-Rs 10,000 per scan. What we have developed is that only on the basis of scientific innovation, we can reduce that cost by 50 per cent,” Tata Trusts Head (Innovation and Entrepreneurship) and CEO FISE Manoj Kumar told PTI.

With further business innovation, planning and scale, the cost of an MRI scan can be lowered further, he added.

Tata Trusts had supported Voxelgrids right from development to introduction of the MRI scanner. Sri Sathya Sai Institute of Higher Medical Sciences is the clinical partner for the development, where the first system has been installed.

“Between August and December we will be parallelly working on human clinical trials for the scanner and design plan for manufacturing. Our plan

is that by 2019 the product should be in the market,” Kumar said.

A further investment of Rs 10 crore would be made for manufacturing, which will be done here in India, he added.

Highlighting the advantages of the innovation, he said the new MRI can scan 3 to 4 times faster than those currently available in the market.

IIT team’s solar powered system can convert plastic into fuel

Scientists from IIT Madras have developed a solar powered system to convert non-recyclable plastic into fuel that can substitute diesel used in generators, furnaces and engines.

The technology - which consists of a mobile unit that can collect and process waste - currently yields around 0.7 litres of fuel oil per kilogramme of plastic, researchers said.

“India produces approximately 15,000 tonnes of plastic waste in a day. Centralised systems for plastic waste management cannot work to effectively deal with this much plastic waste on a daily basis,” said Ramya Selvaraj, a research student at the Indian Institute of Technology (IIT) Madras in Tamil Nadu.

“We thought that if the plastic can’t come to the industry, let the industry come to the plastic,” Selvaraj said.

The team showcased its project on the occasion of the World Environment Day, hosted by the United Nations (UN) in New Delhi.

The theme of this year’s World Environment Day was “Beat Plastic Pollution”.

The conversion of plastic to fuel involves a process called pyrolysis - a thermochemical treatment that exposes the material to high temperature in the absence of oxygen, leading it to go through physical and chemical changes.

This creates a low density fuel oil by breaking down the polymer chain of plastic at the temperature of 350- 500 degrees Celsius. This oil can be used as

a substitute for diesel to power generators, furnaces and engines.

Govt approves Rs 10,000-cr continuation programmes for PSLV, GSLV

The Union government on Wednesday approved the continuation of the Polar Satellite Launch Vehicle and Geosynchronous Satellite Launch Vehicle Mark-III programmes, together costing more than Rs 10,000 crore, in a move that will help ISRO launch light and heavy-weight satellites.

The operationalisation of PSLV, ISRO’s most-trusted workhorse, has made India self-reliant in launching satellites for earth observation, disaster management, navigation and space sciences.

For heavy satellites, India is helped by the French, which launches its satellites from Kourou in French Guiana in South America.

The cabinet, chaired by Prime Minister Narendra Modi, also gave its nod for funding 30 PSLV operational flights under the programme.

The PSLV programme is expected to meet the launch requirements of satellites for earth observation, navigation and space sciences and will also ensure the continuity of production by the Indian industry.

The fund requirement is Rs 6,131 crore and includes the cost of 30 PSLV vehicles, essential facility augmentation, programme management and launch campaign.

The PSLV Continuation Programme (Phase 6) will meet the demand for launch of satellites at a frequency of up to eight launches per year, with maximum participation from the Indian industry.

Air quality analysis of 10 cities points out ‘multi-pollutant crisis’ there: Claims NGO

An analysis of air quality of 10 state capitals of the country during last winter and in the past two months this summer has showed that they too are in

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the “dangerous grip” of a multi-pollutant crisis, besides Delhi, a green NGO today claimed.

The analysed data is part of the State of India’s Environment (SoE) in Figures 2018, an annual compendium of environmental statistics put together by Down To Earth magazine, which the Centre for Science and Environment (CSE) helps publish.

“Delhi is always in the news for its poor air quality. However, an analysis of the winter (November and December 2017) and summer (April-May 27, 2018) air quality levels of 10 state capital cities shows that they too are in the dangerous grip of a multi-pollutant crisis, and are currently facing a severe health challenge,” the CSE claimed in a statement today.

While in the summer months, Delhi had “65 per cent days” when poor and very poor air quality was recorded, in winters this percentage increased to 85. On only “about 1 per cent” of the monitored days in summer months was the air quality observed to be satisfactory in the city, it said.

“Lucknow fared much worse in the winter months, where very poor air quality was recorded on over 70 per cent of the monitored days and severe levels of air pollution witnessed on around 24 per cent of the days. Thiruvananthapuram, Bengaluru and Chennai, on the other hand, experienced comparatively better air quality,” the statement said.

Analytics, BI software mkt in India to touch \$304 mn in 2018: Gartner

Analytics and business intelligence software market in India is expected to reach USD 304 million in 2018, growing 18.1 per cent over last year, research firm Gartner said.

The analytics and BI software market is expected to further grow to USD 356.2 million by 2019, as compared to USD 257 million in 2017, Gartner said in a report.

Indian organisations are increasingly moving from traditional enterprise reporting to augmented

analytics tools that accelerate data preparation and data cleansing, it said.

It added that this change is expected “to positively impact the analytics and business intelligence (BI) software market in India”.

“The ‘fast followers’ are even looking to make heavy investments in advanced analytics solutions driven by artificial intelligence and machine learning, to reduce the time to market and accuracy of analytics offerings,” Gartner Principal Research Analyst Ehtisham Zaidi said.

He added that unavailability of talent will continue to be a major inhibitor toward adoption of these new-age tools.

Of the total market, spending on traditional BI platforms stood at USD 102.5 million, while that on modern BI platforms and corporate performance management (CPM) suites were at USD 59.1 million and USD 40.5 million, respectively, in 2017.

Environment Day a mission for India: Vardhan

For India, World Environment Day 2018 is not a “symbolic” celebration, but a mission, Union Environment Minister Harsh Vardhan said.

The minister during the World Environment Day celebrations invited people to take care of their Green Social Responsibility and urged them to take up Green Good Deeds in everyday life.

He said 700 Green Good Deeds are available and people are required to take small positive actions without any extra efforts that can help conserve our environment.

Addressing the gathering, Erik Solheim, Executive Director, UN Environment said plastic is a huge environmental and health issue while mentioning that individual in tackling plastic pollution and taking specific measures to deal with single use plastic.

Union Environment Secretary C K Mishra highlighted that great ideas have come up during this

event and there is a need to package all these ideas in a nice way.

He also briefly highlighted that the Paris Agreement (PA) and Sustainable Development Goals (SDGs) are the two important agreements that have been adopted in the year 2015.

He said that India is taking every action to fulfil its commitment and goal under the PA and SDGs.

In his keynote address, the secretary of the Department of Economic Affairs, Ministry of Finance, highlighted accounting for GDP and requirement of new technology for managing forest, natural resources etc in an efficient way.

Four plenary sessions was also organised, the first being on “Natural Capital of India: Status and Policy Implications”.

MoES introduces new forecast model to give accurate prediction

The Ministry of Earth Science (MoES) launched the Ensemble Prediction System (EPS) for generating more accurate and area specific forecast of extreme weather events like rains, heat wave and cold wave.

The EPS will not only enable the India Meteorological Department (IMD) to give forecast five days before, but would also add the probability of occurrence of an extreme weather event with its level of intensity.

Under the new model, the area of spatial resolution, which is 23 km grid scale, will reduce to 12 km, that will enable the meteorological department to give district-level warning, said Mritunjay Mohapatra, Additional Director General of IMD.

Last month, the IMD had come under attack for going over-board in issuing an alert of thunderstorm in Delhi, which did not take place.

The new EPS system has been developed by the IMD, National Centre for Medium Range Weather Forecasting (NCMRWF) and the Indian Institute of Tropical Meteorology—all three are under the MoES.

The frameworks of the new EPS are among the best weather prediction systems in the world at present and very few forecasting centres in the world use this high resolution for short-medium range probabilistic weather forecasts, said M Rajeevan, Secretary, MoES.

ISRO offers tech transfer to ‘qualified’ industries

The Indian Space Research Organisation (ISRO) today floated a request for qualification (RFQ) for technology-transfer of lithium-ion cell to Indian industries.

ISRO’s Vikram Sarabhai Space Centre (VSSC) has offered to transfer the in-house developed li-ion cell technology to competent industries on a ‘non-exclusive’ basis to establish Li-ion cell production facilities in the country.

Li-ion cells find wide applications in electronic gadgets, telecommunication, industrial applications as well as in aerospace.

This initiative is expected to enable Zero Emission Policy of India and accelerate the development of indigenous electric vehicle industry, ISRO said in a statement said.

According to ISRO, presently, Lithium-ion battery is the most dominating battery system which finds applications for a variety of societal needs, including mobile phones, laptops, PDA, cameras and many other portable consumer gadgets.

Recent advances in Li-ion battery technology have made it the preferred power source for electric and hybrid electric vehicles also.

“VSSC, ISRO is now offering to transfer this technology to competent Indian industries/start-ups on non-exclusive basis to establish Li-ion cell production facilities in the country that can produce cells of varying size, capacity, energy density and power density catering to the entire spectrum of power storage requirements,” the ISRO said.

Cabinet apprised of pact between health bodies of India, France

The Union Cabinet apprised about a pact signed between two health bodies of India and France, which aims at cooperation in medical, life sciences and health research sectors including diabetes and metabolic disorders.

The pact also aims at cooperation in bio-ethics with focus on ethics and regulatory issues of gene editing techniques and rare diseases.

“The Union Cabinet chaired by Prime Minister Narendra Modi has been apprised of an MoU which was signed in March, 2018 between the Indian Council of Medical Research (ICMR) and the Institut National de la Santeet de la Recherche Medicale (INSERM), France,” an official statement said.

The MoU will further strengthen relations between ICMR and INSERM within the framework of international scientific and technological cooperation in fields of mutual interest, it said.

“The MoU aims at cooperation in areas of common interest within the medical, life sciences and health research fields. Based on scientific excellence on both sides, the parties have agreed to have a specific focus upon: Diabetes and metabolic disorders, bio-ethics with focus on ethics and regulatory issues of gene editing techniques, rare diseases and any other areas of mutual interest can be considered after discussions between the two sides,” it said. The scientific excellence on two sides will help to successfully work on health research in specified areas, it added.

WHO commends India for reducing maternal mortality ratio by 77 pc

The WHO has commended India’s progress in reducing the maternal mortality ratio (MMR) by 77 per cent, from 556 per 1,00,000 live births in 1990 to 130 per 1,00,000 live births in 2016.

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It said this progress puts the country on track towards achieving the Sustainable Development Goal (SDG) target of an MMR below 70 by 2030.

India’s present MMR is below the Millennium Development Goal (MDG) target.

WHO Regional Director for South-East Asia, Poonam Khetrapal Singh said the country has made a concerted push to increase access to quality maternal health services with the coverage of essential maternal health services having doubled since 2005.

Also, the proportion of institutional deliveries in public facilities has almost tripled, from 18 per cent in 2005 to 52 per cent in 2016 (including private facilities, institutional deliveries now stand at 79 per cent), she said.

State-subsidised demand-side financing like the Janani Shishu Suraksha Karyakram (JSSK) – which allows all pregnant women delivering in public health institutions free transport and no-expense delivery, including caesarian section – has largely closed the urban-rural divide traditionally seen in institutional births, Singh claimed.

Buffalo research centre to start soon in Tarn Taran

A buffalo research centre of national acclaim would soon start operation at village Booh in district Tarn Taran of Punjab, a minister said.

The motive behind setting up the research centre was to encourage farmers to opt for animal husbandry and dairy professions, Balbir Singh Sidhu, minister for animal husbandry, dairy development and fisheries said.

He was presiding over a meeting held to review the progress on the setting up of the centre.

Sidhu said the Punjab government, in its maiden budget, had earmarked Rs 20 crore for the establishment of a buffalo research centre at Patti, district Tarn Taran. However, during a meeting, it was decided that the centre would start its operation

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from Krishi Vigyan Kendra (KVK) at village Booh, he said.

The centre would be affiliated with Guru Angad Dev Veterinary and Animal Sciences University, he

said. Farmers would be imparted training on the animal husbandry and dairy farming with latest available technology at the centre, he said. Sidhu said he would visit Booh on June 25.



'NASA flies large unmanned aircraft in public airspace'

NASA has for the first time successfully flown its large remotely-piloted Ikhana aircraft in the public airspace without a safety chase airplane, the US space agency said.

"This historic flight moves the US one step closer to normalising unmanned aircraft operations in the airspace used by commercial and private pilots," NASA said in a statement.

Flying these large remotely-piloted aircraft over the US opens the doors to services such as monitoring and fighting forest fires to providing new emergency search and rescue operations, according to NASA.

The technology in this aircraft could, at some point, be scaled down for use in other general aviation aircraft, it said.

"This is a huge milestone for our Unmanned Aircraft Systems Integration in the National Airspace System project team," said Ed Waggoner, NASA's Integrated Aviation Systems Program director.

Flights of large craft like Ikhana, have traditionally required a safety chase aircraft to follow the unmanned aircraft as it travels through the same airspace used by commercial aircraft.

The US Federal Aviation Administration (FAA) granted NASA special permission to conduct this flight under the authority of a Certificate of Waiver or Authorization on March 30.

New 28-GHz transceiver paves the way for future 5G devices

Scientists have designed a tiny, incredibly fast and accurate 28-gigahertz (GHz) transceiver meant for stable high-speed 5G communications.

The transceiver (transmitter and receiver) fabricated at Tokyo Institute of Technology in Japan trumps previous designs in various regards by taking a new approach for beam steering.

The importance of wireless communications is evident in modern societies, and a lot of work has been done on 5th-Generation Wireless Systems (5G) communications as it is the upcoming big step in mobile networks.

The new standard for mobile networks promises data rates and speeds at least an order of magnitude higher than those of 4G, while even allowing for smaller antennas and radio frequency (RF) transceivers because of the higher frequencies used.

Most state-of-the-art transceivers designed for 5G employ RF phase shifters.

Accurate phase shifting is important because it allows the transceiver to guide the main lobe of the radiation pattern of the antenna array.

In other words, it is used to "point" the antenna array towards a specific direction so that both communicating ends (transmitter and receiver) exchange signals with the highest power possible.

However, using RF phase shifters brings about certain complications and does not quite make the cut for 5G.

Scientists led by Associate Professor Kenichi Okada from Tokyo Institute of Technology developed a 28-GHz transceiver employing a local oscillator (LO) phase shifting approach.

Particles from early solar system found in comet dust

Scientists have discovered that interplanetary dust particles in comets contain leftovers from the early solar system, which may provide a deeper understanding of how the planets were formed.

Researchers from University of Hawaii showed that the initial solids from which the solar system was formed consisted almost entirely of amorphous silicate, carbon and ices.

This dust was mostly destroyed and reworked by processes that led to the formation of planets. Surviving samples of pre-solar dust are most likely

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to be preserved in comets - small, cold bodies that formed in the outer solar nebula.

In a relatively obscure class of interplanetary dust particles believed to originate from comets, there are tiny glassy grains called GEMS (glass embedded with metal and sulphides) typically only tens to hundreds of nanometres in diameter, less than 1/100th the thickness of human hair.

Using transmission electron microscopy, researchers made maps of the element distributions and discovered that these glassy grains are made up of subgrains that aggregated together in a different environment and prior to the formation of the comet parent body.

This aggregate is encapsulated by carbon of a different type than the carbon that forms a matrix gluing together GEMS and other components of cometary dust.

Mini-device can help prevent heart failure

Scientists have developed a tiny device that can deliver drugs to damaged tissues and prevent heart failure.

After a patient has a heart attack, a cascade of events leading to heart failure begins. Damage to the area in the heart where a blood vessel was blocked leads to scar tissue.

In response to scarring, the heart will remodel to compensate. This process often ends in ventricular or valve failure.

Researchers including those from Harvard University in the US and Royal College of Surgeons in Ireland hope to halt the progression from heart attack to heart failure with a small device called 'Therepi'.

The device contains a reservoir that attaches directly to the damaged heart tissue. A refill line connects the reservoir to a port on or under the patient's skin where therapies can be injected either by the patient or a healthcare professional.

"After a heart attack we could use this device to deliver therapy to prevent a patient from getting heart failure," said Ellen Roche, assistant professor at Massachusetts Institute of Technology (MIT) in the US.

"If the patient already has some degree of heart failure, we can use the device to attenuate the progression," said Roche.

Two of the most common systems currently used for delivering therapies to prevent heart failure are inefficient and invasive. In one method, drugs are delivered systemically rather than being administered directly to the site of the damage.

AI system can track human movements from behind walls

MIT scientists have developed an artificial intelligence (AI) X-ray vision system that can sense people's postures and movements from the other side of a solid wall.

The "RF-Pose" uses AI to teach wireless devices to sense people's postures and movement, even from the other side of a wall.

The researchers used a neural network to analyse radio signals that bounce off people's bodies, and can then create a dynamic stick figure that walks, stops, sits and moves its limbs as the person performs those actions.

The team said that the system could be used to monitor diseases like Parkinson's and multiple sclerosis (MS), providing a better understanding of disease progression and allowing doctors to adjust medications accordingly.

It could also help elderly people live more independently, while providing the added security of monitoring for falls, injuries and changes in activity patterns.

The team is currently working with doctors to explore multiple applications in healthcare.

"We've seen that monitoring patients' walking speed and ability to do basic activities on their own

gives healthcare providers a window into their lives that they didn't have before, which could be meaningful for a whole range of diseases," said Dina Katabi from Massachusetts Institute of Technology (MIT) in the US.

New system can spot cyberbullies on social media

Scientists, including one of Indian origin, have developed a new technique that can spot nasty personal attacks by cyberbullies on social media and alert parents or network administrators when abuse has occurred.

The approach developed by researchers at the University of Colorado Boulder in the US, uses five times less computing resources than existing tools.

That is efficient enough to monitor a network the size of Instagram for a modest investment in server power, said Richard Han, an associate professor at UC Boulder.

"The response of the social media networks to fake news has recently started to uptick, even though it took grave consequences to reach that point. The response needs to be just as strong for cyberbullying," said Han.

The group also released a free Android app called BullyAlert that allows parents to receive alerts when their kids are the objects of bullying on Instagram.

The app can learn from and adapt to what parents consider bullying, researchers said.

"As parent, I know that a lot of times we are not in full knowledge of what our children are doing on their social networks," said Shivakant Mishra, a professor at UC Boulder.

"An app like this that informs us when something problematic is happening is invaluable," Mishra said.

To build their toolbox, the researchers first employed humans to teach a computer programme how to separate benign online comments from abuse.

Global warming will make veggies harder to find: study

Global warming is expected to make vegetables significantly scarcer around the world, unless new growing practices and resilient crop varieties are adopted, researchers warned today.

By the end of this century, less water and hotter air will combine to cut average yields of vegetables — which are crucial to a healthy diet — by nearly one-third, said the report in the Proceedings of the National Academy of Sciences.

A 7.2 Fahrenheit (4 Celsius) increase in temperature, which scientists expect by 2100 if global warming continues on its current trajectory, reduces average yields by 31.5 per cent, said the report.

"Our study shows that environmental changes such as increased temperature and water scarcity may pose a real threat to global agricultural production, with likely further impacts on food security and population health," said lead author Pauline Scheelbeek of the London School of Hygiene and Tropical Medicine.

Southern Europe, large parts of Africa and South Asia may be particularly affected.

The findings are based on a systematic review of 174 studies examining the impact of environmental exposures on yield and nutritional content of vegetables and legumes since 1975.

World's largest iceberg set to disappear after 18-year-long journey

The largest iceberg ever recorded, that broke away from Antarctica's Ross Ice Shelf 18 years ago, could be nearing the end of its voyage, according to NASA.

When iceberg B-15 first broke away in March 2000, it measured about 296 kilometres long and 37 kilometres wide. B-15 has since fractured into numerous smaller bergs, and most have melted away.

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Just four pieces remain that meet the minimum size requirement - at least 37 kilometres to be tracked by the US National Ice Center.

When astronauts aboard the International Space Station (ISS) shot a photograph of the iceberg on May 22 this year, B-15Z measured about 18 kilometres long and nine kilometres wide.

That is still well within the trackable size, NASA said in a statement. However, the iceberg may not be tracked much longer if it splinters into smaller pieces.

A large fracture is visible along the centre of the berg, and smaller pieces are splintering off from the edges.

Melting and breakup would not be surprising, given the berg's long journey and northerly location. A previous image showed B-15Z farther south in October 2017, after it had ridden the coastal countercurrent about three-quarters of the way around Antarctica bringing it to the Southern Ocean off the tip of the Antarctic Peninsula.

Star system with three Earth-sized planets discovered

Scientists have discovered two new planetary systems, one of which hosts three Earth-sized planets.

Researchers from Instituto de Astrofísica de Canarias (IAC) and the University of Oviedo in Spain analysed the data collected by the K2 mission of NASA's Kepler satellite, which started in November 2013.

The study, published in the journal *Monthly Notices of the Royal Astronomical Society* (MNRAS), reveals the existence of two new planetary systems detected from the eclipses they produce in the stellar light of their respective stars.

The first exoplanetary system is located in the star K2-239, characterised as a red dwarf type M3V from observations made with the Gran Telescopio

Canarias (GTC), at the Roque de los Muchachos Observatory (Garafia, La Palma).

It is located in the constellation of the Sextant at 50 parsecs from the Sun (at about 160 light years). It has a compact system of at least three rocky planets of similar size to the Earth (1.1, 1.0 and 1.1 Earth radii) that orbit the star every 5.2, 7.8 and 10.1 days, respectively.

The other red dwarf star, called K2-240, has two super-Earth-like planets about twice the size of our planet. The atmospheric temperature of red dwarf stars around which these planets revolve is 3,450 and 3,800 Kelvin respectively, almost half the temperature of the sun.

These researchers estimate that all planets discovered will have temperatures tens of degrees higher than those of Earth due to the strong radiation they receive in these close orbits to their stars.

Novel imaging technique can capture over 10k genes at once

In a breakthrough, scientists have developed a new technique that enables them to image 10,421 genes at once within individual cells.

The technique, called intron seqFISH (sequential fluorescence in situ hybridisation), is a major advance in being able to identify what goes on across the genome in hundreds of different cells at once.

"This technique can be applied to any tissue," said Long Cai, research professor at California Institute of Technology in the US.

"Intron seqFISH can help identify cell types and also what the cells are going to do, in addition to giving us a look at the chromosome structure in the same cells," said Cai.

Previously, researchers could only image four to five genes at a time in cells with microscopy.

Scaling seqFISH up to a genomic level now enables the imaging of over 10,000 genes - about half of the total number of genes in mammals -

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within single cells, according to the research published in the journal *Cell*.

In order for genetic instructions to be turned into an actual functioning protein, a process called transcription must first occur. This process often occurs in pulses, or “bursts.”

First, a gene will be read and copied into a precursor messenger RNA, or pre-mRNA, like jotting a quick, rough draft. This molecule then matures into a messenger RNA, or mRNA, akin to editing the rough draft.

Solar-powered system can harvest fresh water from air

Scientists have developed a system that can harvest water out of the air using just solar power, an advance ideal for people living in arid areas of the world.

The prototype, developed by researchers at University of California, Berkeley in the US, can extract drinkable water every day/night cycle at very low humidity and at low cost.

“It operates at ambient temperature with ambient sunlight, and with no additional energy input you can collect water in the desert. This laboratory-to-desert journey allowed us to really turn water harvesting from an interesting phenomenon into a science,” said Omar Yaghi, who invented the technology underlying the harvester.

The trial in Scottsdale, where the relative humidity drops from a high of 40 per cent at night to as low as 8 per cent during the day, demonstrated that the harvester should be easy to scale up by simply adding more of the water absorber, a highly porous material called a metal-organic framework (MOF).

Metal-organic frameworks are solids with so many internal channels and holes that a sugar-cube-size MOF might have an internal surface area the size of six football fields.

This surface area easily absorbs gases or liquids but, just as important, quickly releases them when heated.

The researchers anticipate that with the current MOF (MOF-801), made from the expensive metal zirconium, they will ultimately be able to harvest about 200 millilitres of water per kilogramme of MOF.

Ancient Greenland was much warmer than thought

Greenland was once much warmer than previously thought, say scientists who have discovered remains of ancient life in lake mud of the region that survived the last ice age.

The mud, discovered by researchers at the Northwestern University in the US, has remains of common flies nestled within it, which record two interglacial periods in northwest Greenland.

Although researchers have long known these two periods - the early Holocene and Last Interglacial - experienced warming in the Arctic due to changes in the Earth’s orbit, the mix of fly species preserved from these times shows that Greenland was even warmer than previously thought.

This information could help researchers better gauge Greenland’s sensitivity to warming, by testing and improving models of climate and ice sheet behaviour.

Those models could then improve predictions of how Greenland’s ice sheet, which covers 80 per cent of the Arctic country and holds enough ice to equal 20 feet of global sea level, might respond to man-made global warming.

“Northwest Greenland might feel really remote, but what happens to that ice sheet is going to matter to everyone in New York City, Miami and every coastal city around the world,” said Yarrow Axford, an associate professor at Northwestern.

“One of the big uncertainties in climate science remains how fast the Earth changes when it gets warmer. Geology gives us an opportunity to see what

happened when the Earth was warmer than today,” said Axford.

Tiny, Earth-bound asteroid disintegrates over Africa: NASA

A boulder-sized asteroid on a collision course with Earth reportedly disintegrated in the atmosphere - lighting up the sky over Botswana, according to NASA.

The asteroid, estimated to be only about two metres across, was first discovered on June 2 by the Catalina Sky Survey, operated by the University of Arizona.

Designated 2018 LA, the asteroid was small enough that it was expected to safely disintegrate in Earth’s atmosphere.

Although there was not enough tracking data to make precise predictions ahead of time, a swath of possible locations was calculated stretching from Southern Africa, across the Indian Ocean, and onto New Guinea.

Reports of a bright fireball above Botswana, Africa, early Saturday evening match up with the predicted trajectory for the asteroid.

The asteroid entered Earth’s atmosphere at the high speed of 17 kilometres per second at about 6:44 pm local Botswana time and disintegrated several miles above the surface, creating a bright fireball that lit up the evening sky.

When it was first detected, the asteroid was nearly as far away as the Moon’s orbit, although that was not initially known. The asteroid appeared as a streak in the series of time-exposure images taken by the Catalina telescope.

New way to help remove ‘off-flavour’ from wines

Scientists have found a way to use tiny magnetic particles to remove off-tasting substances in wine without altering its desired aroma.

From vine to wine, grapes undergo a remarkable transformation. However, sometimes this makeover results in vino that does not taste quite right,

according to researchers at the University of Adelaide in Australia.

In a study published in the Journal of Agricultural and Food Chemistry, scientists report that they have found a way to use tiny magnetic particles to remove off-tasting substances in cabernet sauvignon without altering its desired bouquet.

Eventually, they say this technique could help remove unwanted flavours from other wines.

All wines naturally contain substances that contribute to their distinctive flavours and aromas.

One group of these substances called alkylmethoxypyrazines (MPs) produces vegetable-like aromas in certain varietal wines such as cabernet sauvignon.

However, in excessive amounts, MPs can overwhelm the fruity or floral bouquet that connoisseurs have come to expect from wine, resulting in unbalanced sensory characteristics.

These off-putting aromas and flavours often arise in grapes that are harvested early or are grown in cool climates.

Vintners have unsuccessfully tried to remediate this problem by using additives such as activated charcoal and deodorised oak chips.

Smoking, diabetes may up calcium deposits in brain

People who smoke or have diabetes may be at a high risk of developing abnormal deposits of calcium in the brain region crucial to memory, a study has found.

Dementia is a major public health problem that affects tens of millions of people worldwide.

One focus of dementia research has been the hippocampus, a brain structure important for both short- and long-term memory storage.

Alzheimer’s disease, the most common type of dementia, is associated with atrophy of the hippocampus.

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Researchers have anticipated that calcifications or abnormal buildups of calcium in the hippocampus region of the brain may be related to vascular problems, that could contribute to hippocampal atrophy and subsequent cognitive deterioration.

We know that calcifications in the hippocampus are common, especially with increasing age,” said Esther J M de Brouwer, from University Medical Center in Utrecht in The Netherlands.

“However, we did not know if calcifications in the hippocampus related to cognitive function,” she added.

Researcher studied the association between vascular risk factors like high blood pressure, diabetes and smoking and hippocampal calcifications.

Over 100 exoplanets that may host habitable moons identified

Scientists have identified more than 100 giant planets outside our solar system that may potentially host moons capable of supporting life.

The finding, published in *The Astrophysical Journal*, will guide the design of future telescopes

that can detect these potential moons and look for tell-tale signs of life, called biosignatures, in their atmospheres.

“There are currently 175 known moons orbiting the eight planets in our solar system,” said Stephen Kane, an associate professor at University of California, Riverside in the US.

“While most of these moons orbit Saturn and Jupiter, which are outside the Sun’s habitable zone, that may not be the case in other solar systems,” said Kane. The researchers, including those from the University of Southern Queensland in Australia, identified 121 giant planets that have orbits within the habitable zones of their stars.

At more than three times the radii of the Earth, these gaseous planets are less common than terrestrial planets, but each is expected to host several large moons.

“Including rocky exomoons in our search for life in space will greatly expand the places we can look,” he said. Since the 2009 launch of NASA’s Kepler telescope, scientists have identified thousands of planets outside our solar system, which are called exoplanets.

Severe uranium contamination in India's groundwater: Study

Scientists have found widespread uranium contamination in groundwater from aquifers across 16 states in India, much above the WHO provisional standard for the country.

The findings published in the journal *Environmental Science & Technology Letters* are the first to demonstrate the predominant prevalence of uranium in India's groundwater.

The researchers from Duke University in the US unveiled new data showing that the occurrence in uranium in Indian groundwater - a primary source of drinking water and irrigation - is an emerging and widespread phenomenon.

They compiled data on groundwater uranium from 16 Indian states and new data from 324 wells in Rajasthan and Gujarat that shows a high prevalence of uranium concentrations above the World Health Organization (WHO) provisional guideline value across India.

The WHO has set a provisional safe drinking water standard of 30 microgrammes of uranium per litre for India, a level that is consistent with US Environmental Protection Agency standards.

Despite this, uranium is not yet included in the list of contaminants monitored under the Bureau of Indian Standards' Drinking Water Specifications, researchers said.

The study suggests that contribution of human factors such as groundwater depletion and nitrate pollution may be aggravating the already present natural uranium contamination to dangerous levels.

Novel material can remove pollutants from water

Scientists have identified absorbent materials that can help soak up pollutants found in urban waste water in less than 24 hours.

Researchers from University of Seville in Spain evaluated two types of phyllosilicates: a highly-charged expandable synthetic mica (Na-Mica-4), and one obtained from cation exchange with an organo-functionalised mica (C18-Mica-4).

Phyllosilicates are a subclass of silicates and include common mineral in very different environments.

The results show that the material C18-Mica-4 is capable of eliminating the majority of pollutants that were evaluated in urban waste water, as well as surface water and potable water.

The study also provides data on the adsorption mechanism and establishes a significant correlation between the physical chemical properties of the selected criteria and emerging pollutants and the adsorption to the material.

In total, 18 organic pollutants were studied, among which were industrial pollutants, personal care products, and the pharmacological active ingredients such as anti-inflammatories, antibiotics, anti-epileptics, central nervous system stimulants and lipid-lowering agents, among others.

Within the industrial pollutants, several compounds frequently used as cleaning products were analysed, as well as others used as water- and oil-repellents. With the personal care products, two synthetic preservatives were analysed (methylparaben and propylparaben), both widely used in cosmetic and pharmaceutical products.

Wireless system can power devices inside our body

Scientists have developed a new way to power the devices implanted deep within the human body and wirelessly communicate with them, paving the way for new ways to deliver drugs, monitor internal conditions, and treat diseases.

The implants are powered by radio frequency waves, which can safely pass through human tissues. In animal tests, researchers showed that the waves

can power devices located 10 centimeters deep in tissue, from a distance of one metre.

“Even though these tiny implantable devices have no batteries, we can now communicate with them from a distance outside the body. This opens up entirely new types of medical applications,” said Fadel Adib, an assistant professor at Massachusetts Institute of Technology in the US.

Since they do not require a battery, the devices can be tiny. In this study, the researchers tested a prototype about the size of a grain of rice, but they anticipate that it could be made even smaller.

“Having the capacity to communicate with these systems without the need for a battery would be a significant advance. These devices could be compatible with sensing conditions as well as aiding in the delivery of a drug,” said Giovanni Traverso, an assistant professor at Brigham and Women’s Hospital (BWH) in the US.

Medical devices that can be ingested or implanted in the body could offer doctors new ways to diagnose, monitor, and treat many diseases. Researchers are now working on a variety of ingestible systems that can be used to deliver drugs, monitor vital signs, and detect movement of the GI tract

Earth days getting longer due to Moon

Days on the Earth are getting longer, thanks to the movement of the Moon away from the planet, according to a study which found that 1.4 billion years ago a day lasted just over 18 hours.

The study, published in the journal *Proceedings of the National Academy of Sciences*, reconstructs the deep history of our planet’s relationship to the Moon. It shows that 1.4 billion years ago, the Moon was closer and changed the way the Earth spun around its axis.

“As the Moon moves away, the Earth is like a spinning figure skater who slows down as they stretch

their arms out,” said Stephen Meyers, professor at the University of Wisconsin-Madison in the US.

It describes a tool, a statistical method, that links astronomical theory with geological observation (called astrochronology) to look back on Earth’s geologic past, reconstruct the history of the solar system and understand ancient climate change as captured in the rock record.

“One of our ambitions was to use astrochronology to tell time in the most distant past, to develop very ancient geological time scales,” Meyers said.

“We want to be able to study rocks that are billions of years old in a way that is comparable to how we study modern geologic processes,” he said.

Earth’s movement in space is influenced by the other astronomical bodies that exert force on it, like other planets and the Moon.

Immunotherapy cures late-stage breast cancer in world first: study

A woman with an aggressive form of breast cancer which defied chemotherapy and spread to other organs, was cured with an experimental treatment that triggered her immune system, researchers said today.

The woman has been cancer-free for two years, reported the US-based team, presenting their results as “a new immunotherapy approach” for the treatment of patients with a late-stage form of the disease.

Other experts not involved in the work hailed it as “exciting”.

So-called “immunotherapy” has already been shown to work in some people with cancer of the lung, cervix, blood cells (leukaemia), skin (melanoma) and bladder.

But an immune breakthrough for bowel, breast and ovary cancer has remained elusive.

In the latest study, a team extracted immune cells called lymphocytes from the patient, tweaked them in the lab, then reinjected them.

The woman was 49 when she signed up for the clinical trial after several attempts at a cure through conventional treatments had failed, said the study published in the scientific journal Nature Medicine.

The cancer had spread to various parts of her body, including the liver.

A person's immune system is designed to kill invaders, including rogue, cancerous cells. But it can fail, often because it cannot recognise cancer cells containing the patient's own DNA.

NASA's mini-satellites successfully steer towards Mars

The world's first mini-satellites to venture into deep space - designed to monitor NASA's InSight Mars lander - have successfully oriented themselves towards the red planet, according to the US space agency.

Over the last week, two CubeSats called MarCO-A and MarCO-B have been firing their propulsion systems to guide themselves toward Mars.

This process, called a trajectory correction manoeuvre, allows a spacecraft to refine its path to Mars following launch. Both CubeSats successfully

