

Technology Roundup

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3rd Young Scientists Research Conference

International Conference Revamped Scientific outlook of 21st Century

International Conference on Recent Advances in Electrical Engineering & Computer Sciences

1st International Conference and 4th Workshop on Materials Modeling and Simulations

1st International Conference on Sports, Exercises and Health Sciences

International Conference on Machine Learning and Data Engineering

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KP Govt and NLC Ink Deal for Pakistan's First Digital City

The government of Khyber Pakhtunkhwa has recently signed agreements with various institutions and organizations for technology-based projects. The National Logistics Cell (NLC) also signed an agreement.

The KP government through its Science & Technology and Information Technology Department has signed an agreement with NLC for establishing Pakistan Digital City as the first special technology zone of Khyber Pakhtunkhwa.

The digital city would be established in Haripur, spanning an area of 87 Kanal which would create more than 20,000 direct, indirect and induced high-tech jobs in the province. The aim of establishing the Digital City is to facilitate IT industries, promote the business of ICTs and software companies, encourage innovations and entrepreneurship, and capitalize on the immense job creation potential of ICTs.

The important technologies to be transferred immediately and introduced under the program include High-Tech Manufacturing, Artificial Intelligence, Quantum Computing, Cyber-Physical systems, and Cyber Security.

KP Chief Minister Mahmood Khan attended the signing ceremony as a chief guest. The KP government also signed agreements with Udacity, NETSOL, GSK, and NADRA. The step is an important development toward digital transformation in the province.



Image credit source: <https://www.globalvillagespace.com/pakistan-digital-city/>

PCRET Set to Establish Solar Panel Testing Lab

Pakistan Council of Renewable Energy Technology (PCRET) is all set to establish a solar panel testing laboratory under the project, “Establishment of PAK-KOREA Testing Laboratory for PV Modules and Allied Equipment”.

Federal Secretary for Science and Technology Ghulam Muhammad Memon inaugurated the establishment of Pak-Korea Testing Laboratory for PV-Modules and Allied Equipment. Ambassador of Republic of Korea Sangpyo Suh and Director General PCRET Dr. Syed Attaur Rehman attended the event. The solar panel testing laboratory is being established under a grant-aid project from Korea International Cooperation Agency (KOICA) amounting 9.5 million USD and local Public Sector Development Program (PSDP) having share of Rs 71.629 million. Solar panel testing lab “The testing laboratory” is planned to achieve the status of Certification Body Testing Laboratory (CBTL) in collaboration with Pakistan Standards and Quality Control Authority (PSQCA). The testing laboratory after its completion will be the first testing laboratory of the country having CBTL status. The KOICA will construct the testing laboratory and provide, install and commission all the required equipment for the solar panel testing. The KOICA will also provide one year long training to the PCRET employees for the smooth operation of the project during and after its completion. Obtaining of international certifications including IEC-61215 and IEC-61730 along with ISO-17025 will also be sponsored and facilitated by the Korean side.

The PCRET will provide all the local support required for the execution of the project along with eight kanals of space for the project at Plot no 55, Street 7, Sector H-8/4, Islamabad. The PCRET will also ensure the involvement of its employees to seek training during the project and ensure its execution and operation after its completion. The PSQCA has already initiated the process for adding solar panels in the list of its declared mandatory items.



Source and image credit: <https://www.brecorder.com/news/40189177/pcret-set-to-establish-solar-panel-testing-lab>

E-custom clearance system installed in Gwadar Free Zone

In order to give a strategic boost to commercial activities, an e-custom clearance system “Web Based One Custom” (WeBOC) has been installed in Gwadar Free Zone. It is a milestone development in the history of Gwadar Port Free Zone consisting of the South Free Zone (Phase I) and the North Free Zone (Phase II).

Now all foreign and local companies already registered or to be registered in Gwadar Free Zone will observe a phenomenal growth of their businesses enjoying paperless, ultra-fast, cost-effective and transparent processes and procedures.

It will be an impetus to foreign investors always asking for the activation of E-custom functionality in Gwadar Free Zone. After fulfilling the prerequisite, foreign investment is highly likely to come, which is desperately needed for the struggling Pakistani economy in the current scenario.

The game-changing e-initiative aims to facilitate companies in Gwadar Free Zone to get integrated with Gwadar Port, customs, NLC, FBR, banking channels and other institutions to increase efficiency and reduce the time needed for processing in various departments. WeBOC in Gwadar Free Zone will help with the automation, standardisation and harmonisation of all trade procedures and logistic services related to land, air and sea routes under the Pakistan Single Window (PSW).



Image credit: <https://www.scmp.com/comment/opinion/article/3158658/could-gwadar-port-protests-close-china-pakistan-economic-corridors>

Source: <https://www.pakistantoday.com.pk/2022/07/25/e-custom-clearance-system-installed-in-gwadar-free-zone/>

Pakistani Scientists Developed Low-Cost Anti-bacterial Fabric

The fabric can be used in wound dressing, lab coats, masks and various types of packaging materials. The team led by Saadat Majeed, Associate Professor, Division of Analytical Chemistry at the Bahauddin Zakariya University in Multan, tested the eco-friendly Chitosan and silver nanoparticles modified fabric for four common types of bacteria.

The fabric was very effective in preventing microbial contamination. The research team took the normal fabric and treated it with alkali, which created the active sites in the fabric for modification. Then they dipped the fabric piece in silver nanoparticles and Chitosan – a type of sugar from crabs and lobsters – which coated the cloth with an extra invisible layer. “This coating has active antimicrobial properties and kills the bacterial strains immediately upon contact”. Many other methods involve toxic chemicals or expensive equipment, but this method is relatively easy and affordable. “All we need is a beaker and cost-effective material for modifications,” the researcher added. Chitosan is a biomaterial used for many biomedical applications including antibacterial activities. It has excellent biocompatibility and biodegradability. The positive ionic charges created on the backbone of the chitosan during treatment effectively provide the sites for further modifications and immobilisation. On the other hand, silver nanoparticles are one of the emerging materials in scientific research and development. These nanomaterials exhibit large surface area and tuneable particle size which render them an effective tool in combating bacteria. The coating of these two materials in the fabric can allow protection against microbes with minimal cytotoxicity and synergistically. To check the antimicrobial properties, the team loaded the fabric with four common types of microbes, namely *Micrococcus luteus*, *Staphylococcus aureus*, *Enterobacter aerogenes*, and *E. coli*, responsible for pneumonia, infections, hospital contamination and diarrhoea respectively with other diseases. The results showed that the fabric treatment method has the potential to be used for hospital fabrics, masks, and food packaging materials.



Source and image credit: <https://tribune.com.pk/story/2368166/pakistani-scientists-develop-low-cost-anti-bacterial-fabric>

500 MW Floating Solar Power Plant to be installed At Keenjhar Lake, Sindh

Imtiaz Ahmed Sheikh, Provincial Minister of Sindh for Energy, in a meeting with officials of power companies said that the feasibility study of the project having potential to attract an investment of US\$400 million is in final stages while Letter of Intent (LoI) has been issued in the regard. The minister hoped that Pakistan's solar power plant floating on the water of Lake Keenjhar would start generating electricity in 2 years.

Imtiaz Ahmed Sheikh said that this first and unique floating solar power plant project, first of its kind in Pakistan, will not only provide 500 MW of environment friendly electricity but will also create employment opportunities in the province besides further boosting tourism at famous local tourist spot of Keenjhar Lake.

He said that this 500 MW eco-friendly solar power plant is going to be another milestone of the achievements of the Sindh government.



Source and image credit: <https://tribune.com.pk/story/2365112/sindh-govt-plans-to-launch-floating-solar-power-project>

NUR-E 75, Pakistan's first electric car prototype, unveiled

Pakistan's first electric car prototype, which has been named NUR-E 75, was unveiled on August 14th 2022. The car's battery capacity would be 35kWh. After being charged, the vehicle would have enough power for 210km. According to Dr. Khurshid Qureshi, founder and chairman of the Distinguished Innovation, Collaboration & Entrepreneurship (DICE) Foundation, which designed and developed the prototype, the car would save a lot of fuel, and help combat climate change and sustain economic prosperity. DICE Foundation is a US-based non-profit organisation run by expatriate Pakistanis from the US, the EU and other parts of the world, along with support from local academas and industries.

Dr. Qureshi, a leading expert on developing autonomous vehicles, said the car's production has three phases: the first was industrial design, production and launch; in the second production would be expanded to Sedan and SUV, small commercial trucks and EV platform export; and in the third the cars would be exported. He said production began in 2019, adding that the fully functional prototype, EV NUR-E 75, is ready for testing and regulatory approval, while work on the design of rolling platform to be used for various vehicle segments is underway.

Explaining different features of the five-seater hatchback, he said the car has a peak power of 80kW or 108hp, and a battery capacity of 35kWh covering 210km with the air conditioner turned off. The fully electric car has a maximum speed of 120km/h, tyre size of 16 inches, ground clearance of 190mm and charging capacity at 220V in eight hours, with fast charging also available, he added. DICE Foundation has been working in Pakistan for the past 15 years promoting innovation, building capability and converting brain drain into brain gain. Founded in 2007, the organization's areas of focus are automotive, health, agriculture, energy, creative art and textile.



Source and image credit: <https://www.thenews.com.pk/print/982315-nur-e-75-pakistan-s-first-electric-car-prototype-unveiled>

Pak-China Medical AI Cooperation to Boost Chronic Disease Screening

China-Pakistan medical AI (artificial intelligence) cooperation will boost local chronic disease screening. At the first international “Medical Conference and Exhibition for Next Generation Healthcare” held in Islamabad, where Chinese medical AI leader Airdoc Technology and Pakistan’s well-known medical device import and distribution company Dynamic Medical Company (DMC) officially signed a cooperation agreement to work together to promote the application of Airdoc retinal imaging AI products in Pakistan. Experts from the medical technology field, academic heads and professionals from public health sector attended the conference.

One of the major objectives of this conference was sensitizing the participants, the general public and the government to genetic disorders, its timely diagnosis and available treatments. Faced with the increasingly serious disease burden in Pakistan, advanced medical technology is an inevitable solution at present. Experts agreed that pre-marital testing and counseling in Pakistan’s health care system will effectively relieve the heavy burden of genetic diseases through technological intervention. At the meeting, Yang Yaquan, representative of Airdoc’s overseas business department, gave a keynote speech on “Artificial Intelligence Solutions for Early Screening of Chronic Diseases”. The retina is the only part of the human body that can directly observe blood vessels and nerves non-invasively, thus by observing the subtle changes of blood vessels and nerves on the retina, people can glimpse the clues of more than 200 common chronic diseases. The application of AI technology has made this test more efficient and accessible, making large-scale early screening of chronic diseases possible. It was informed that the Airdoc will promote a portable fundus camera in Pakistan, which looks like a VR glasses, is very convenient to carry, and can be driven by ordinary power banks. After the user completes retinal photography according to the voice prompt, it only takes about 1 minute to receive an assessment report containing dozens of health risks.



Image credit: <https://www.pakistantoday.com.pk/2022/07/08/china-pak-medical-ai-cooperation-to-boost-chronic-disease-screening/>

Source: <https://dailytimes.com.pk/964655/pak-china-medical-ai-cooperation-to-boost-chronic-disease-screening/>

UAE to help Pakistan Set up Plasma Farming Facilities

Ministry of National Health Services (NHS) in a landmark development has discussed development of the plasma farming facilities (PFF) with United Arab Emirates (UAE). A UAE mission, which is on a visit to Pakistan, aims to conduct feasibility study for establishment of PFF in Pakistan based on World Health Organization (WHO) standards as the blood services in country are mostly provided by hospitals' blood banks with no functional separation of the plasma processes into production and utilization. WHO Adviser on Blood Safety Dr Hassan Abbas Zaheer, said that it was a significant development as Pakistan does not have even a single PFF despite the fact that there are a few hundred thousand patients suffering from immunodeficiency disorder. He said that the term to separate blood components was called "Plasma Fractionation" as blood was initially divided into three components called Platelets, Red Blood Cells and White Blood Cells which floated in a fluid called plasma. Dr. Zaheer, who is also former Project Director of Safe Blood Transfusion Project (SBTP), said that a huge industry was required to do "Plasma Fractionation" and if plasma would be separated Pakistan can meet the requirements of the country and can also export it.

The statement issued by the Ministry stated a mission comprising of members of the ruling family of Dubai UAE Sheikh Ahmed Dalmook Al Maktoum, members of Hayat biotech limited, Biotechnology Company in the UAE and contractors from China called on Federal Minister for Health Abdul Qadir Patel. Secretary Health, Special Secretary Health, Director General Health and representatives from hospitals and blood banks in Islamabad were present on the occasion.



Source and image credit: <https://globalaffairs.com.pk/2022/08/uae-to-help-pakistan-set-up-plasma-farming-facilities/>

China supports Pakistan in Geomatics Technology Upgrading

An advanced seminar entitled ‘Geomatics Technology for Pakistan’ sponsored by the Ministry of Commerce of China is ongoing online to help improve Pakistani scientists and officers’ expertise in geomatics. A total of 19 Pakistani experts and officers from the Society of Engineering, National Institute of Computer Sciences, University of AJ & K Muzaffarabad attended this seminar.

According to seminar’s organizer Hunan International Business Vocational College, the seminar is specifically designed to meet the actual needs of Pakistani geo-technical experts based on a series of investigation and research on the development of surveying and mapping technology in Pakistan.

During the 20-day seminar, Chinese experts have been sharing the latest geomatics technology of data analysis, processing and application, and the successful experience and practice in the surveying and mapping industry in China with the Pakistani participants. The seminar is composed of classroom teaching, discussion on specific topics and visits to renowned Chinese enterprises and cutting-edge equipment including VR drones have also been used for practice.

“Through this seminar, Pakistani experts can learn about the updated development of geomatics technology in China, and the Sino-Pak cooperation potential in the field of surveying and geographic informatics has been fully discussed,” Zhong Huiqun from Hunan International Business Vocational College told China Economic Net.



Source and image credit: http://en.ce.cn/Insight/202208/15/t20220815_37963849.shtml

PITB Launches Universal Helpline ‘1421’ for Tourists’ Guidance and Complaints

Punjab Information Technology Board (PITB) in collaboration with Department of Tourist Services (DTS), Punjab has soft-launched the universal helpline ‘1421’ for guidance and complaints related to tourist destinations in Punjab during a ceremony held at Arfa Software Technology Park.

Punjab Tourism Department Secretary Ehsan Bhutta, Deputy Controller Hafiz Ghazanfer, PITB DG e-Governance Sajid Latif, Project Manager PTEGP Waqas Malik, CCC PITB Joint Director Ali Zeb and other senior officials from both sides were present on the occasion. Addressing the ceremony, Punjab Tourism Secretary Ehsan Bhutta said that a special team has been trained for the convenience of tourists which will not only guide them but will also be responsible for providing protection and facilities in case of unpleasant incidents. He further stated that the squads will be deployed at various tourist spots in Punjab, which will be available 24 hours a day to help the tourists. On this occasion, PITB DG e-Governance Sajid Latif said that the objective of training of tourism squad by PITB is to provide facilities to the tourists at various tourist destinations and prevent any untoward incidents. The special tourism squad will comprise of 106 personnel including 11 female staff members. As many as 82 members of this squad will perform their duties on field. The tourism squad will be responsible for handling tourist inquiries and complaints in the field. The squad, which will be initially deployed in Murree, will subsequently cover all 3 tourist destinations in Punjab, i.e. North, Center and South. In this regard, extensive trainings are ongoing to equip the squad with required skills. The Department of Tourist Services, Punjab has also engaged Rescue 1122, Institute of Hospitality Department, Punjab and PITB for this purpose.



Image credit: <https://www.economy.pk/punjab-launch-universal-helpline-1421-for-tourists-guidance-and-complaints/>

Source: <https://nation.com.pk/2022/08/06/pitb-dts-punjab-launch-universal-helpline-1421-for-tourists-guidance-and-complaints/>

Pakistan's First Golink Station – a Revolutionary Way of Fueling

Gas & Oil Pakistan Ltd. (GO) today announced its plans to roll out its new and innovative fuel station concept “goLink” across Pakistan. The goLink Station is a mobile fuel station format that will enable for motorists easy access and convenient fueling services in their direct vicinity. It is designed to significantly reduce driving time for customers to find a petrol pump as it can be deployed on existing parking lots or paved areas.

Speaking at the occasion, Mr. Zeeshan Tayyeb, Chief Operating Officer for GO stated that “goLink Station will significantly reduce the cost of providing vital fueling infrastructure in Pakistan due to reduced space requirements and significantly lower initial investment with each mobile station saving approximately 500,000 liters of fuel for motorists along with 1,200 MTs of reduced carbon emissions every year. It is therefore ideally suited to serve residential, commercial, and business areas as well as remote/seasonally busy areas with much needed motor fuels. The goLink Station can also provide a safe and convenient way of fueling for the gensets operating in Pakistan.” GO has partnered with ENOC Link, the Emirates National Oil Company’s (ENOC) mobile fuel delivery arm, to bring this unique industry innovation to Pakistan. The UAE is one of the most advanced fuel distribution markets globally, and a leader in technology innovation. ENOC Group owns and operates ENOC Link, the digital mobile fuel delivery service in the UAE, created in 2019 as part of ‘Next’, the Group’s digital accelerator program. ENOC Link also runs uniquely designed eLink stations, a mobile fueling format that enables motorists and customers easy access and convenient fueling services. It does not require assembly and can easily move to a different location on the spot and is also equipped with innovative digital systems giving customers a new fueling experience.



Source and image credit: <https://www.gno.com.pk/news-events/pakistans-first-golink-station-a-revolutionary-way-of-fueling/#:~:text=3%20August%202022%3A%20Gas%20%26%20Oil,services%20in%20their%20direct%20vicinity>

Google launches Earthquake alert in Pakistan

Google has launched the Android Earthquake Alerts System in Pakistan today. Android Earthquake Alerts System is a free and useful Android tool that detects and alerts users to earthquakes throughout the world. It makes use of sensors found in Android smart phones. The technology detects seismic activity using accelerometers in active Android devices. It notifies users in two ways: through Search and directly on the Android mobile device itself. Google Search receives near-instant information from the system.

People who search for “earthquake” or “earthquake near me” will get relevant results as well as helpful resources on what to do after an earthquake. Users who do not want to get these alerts can disable them in their device settings. Pakistan has already experienced multiple earthquakes, particularly in the country’s north and west. With the introduction of this earthquake warnings system, Android users in Pakistan may receive automatic early warning messages, allowing them to be better prepared for an emergency.

The Android Earthquake Notifications System shows two sorts of alerts on mobile devices, depending on the magnitude and intensity of the earthquake. Be Aware notifies individuals when earthquakes of magnitude 4.5 or intensity levels 3 or 4 on the MMI scale occur. The notification includes the location of the earthquake’s epicenter. The notification makes use of the phone’s current loudness, vibration, and Do Not Disturb settings.



Source and image credit: <https://www.globalvillagespace.com/google-launches-earthquake-alert-in-pakistan/>

Pakistan Accomplishes First Pediatric Cardiothoracic Surgery

A two-member team of doctors in the capital have successfully conducted pediatric cardiothoracic surgery on a six-month child. It was first of its kind, successful surgery in Pakistan. The child had a hole in the septum that separates the lower two chambers of the heart, also known as ventricular septal defect. This defect allowed oxygen-rich blood to leak into the oxygen-poor blood chambers of the patient's heart. A small hole may close on its own, but this little child's hole required surgery.

The operation was conducted by Dr. Mahim Akmal Malik, an American Diplomat in Congenital Cardiac Surgery. Both belonged to Maroof International Hospital, Islamabad. As soon as the operation was done, the child was discharged from the hospital for his speedy recovery. The open-heart surgery, valve repair and procedures for infants, children, and adolescents have been started now. A team of foreign qualified Pediatric Cardiologists and Cardiothoracic Surgeons was supported by physicians, intensivists, nurses, and anesthesiologists, led by Dr. Mahim Akmal Malik, Pediatric Cardiothoracic Surgeon, and Dr. Muhammad Tariq Jamil, Pediatric Intensivist. Sharing details, Dr. Mahim Malik said that congenital heart defects are very different from the types of heart diseases that are common among adults as repairing hearts in small bodies present an added challenge. She added that pediatric heart surgeons have the special skills needed to provide the safest care for even the youngest and smallest patients who require heart surgery.



Image credit: <https://tribune.com.pk/story/2366161/complicated-paediatric-heart-surgery-pulled-off>

Source: <https://dailytimes.com.pk/969026/pakistan-accomplishes-first-pediatric-cardiothoracic-surgery/>

Massive wall of Saudi Arabia's future Smart City will be Home to 9 Million People

New concept pictures of Saudi Arabia's future smart city "The Line" have been released, and they look breathtaking at the very least. As announced by Saudi Crown Prince Mohammed Bin Salman, The Line is set to be constructed as a roadless and carless smart city that will run purely on renewable energy. The width of the city is to be around only 200 meters, but will be 500 meters tall, and will span a length of over 170 kilometers, making it an extremely long vertical complex that will run along the coast with a capacity for around nine million residents.

From the outside, the city will look like an extremely long wall with mirrored exteriors on both sides. The lack of roads and cars will necessitate a high-speed rail that will run from one end of the city to the other to help residents get to and from their intended destinations with a total travelling time of just over 20 minutes.

As for climate control, the entire city will also boast a natural ventilation system that can maintain comfortable temperatures and conditions all year round, despite its location. "The designs revealed today for the city's vertically-layered communities will challenge the traditional flat, horizontal cities, and create a model for the nature preservation and enhanced human livability," said the prince in a statement.



Source and image credit: <https://sea.mashable.com/life/20955/saudi-arabias-future-smart-city-is-one-massive-wall-thatll-be-home-to-9-million-people>

NUS Researchers invent Self-charging, Ultra-thin Device that Generates Electricity from Air Moisture

Using sea salt as an eco-friendly moisture absorbent, this rechargeable fabric-like ‘battery’ provides higher electrical output than a conventional AA battery, being able to potentially power everyday electronics.

Imagine being able to generate electricity by harnessing moisture in the air around you with just everyday items like sea salt and a piece of fabric, or even powering everyday electronics with a non-toxic battery that is as thin as paper. A team of researchers from the National University of Singapore’s (NUS) College of Design and Engineering (CDE) has developed a new moisture-driven electricity generation (MEG) device made of a thin layer of fabric, about 0.3 millimeters (mm) in thickness, sea salt, carbon ink, and a special water-absorbing gel. The concept of MEG devices is built upon the ability of different materials to generate electricity from the interaction with moisture in the air. This area has been receiving growing interest due to its potential for a wide range of real world applications, including self-powered devices such as wearable electronics like health monitors, electronic skin sensors, and information storage devices.



Assistant Prof. Tan Swee Ching (centre), together with Dr. Zhang Yaoxin (left) and Mr. Qu Hao (right), developed a self-charging fabric (right) that generates electricity from air moisture.

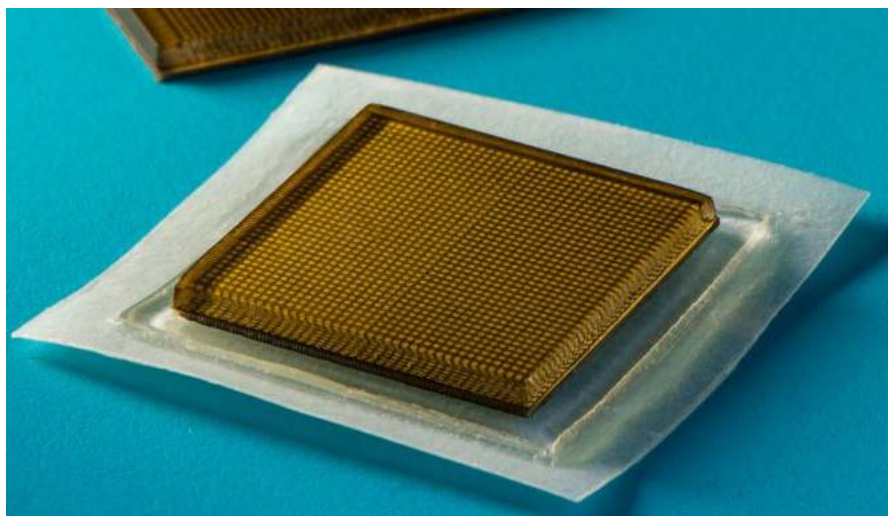
In their study, the team used a commercially available fabric made of wood pulp and polyester. One region of the fabric is coated with a hygroscopic ionic hydrogel, and this region is known as the wet region. Made using sea salt, the special water-absorbing gel can absorb more than six times its original weight, and it is used to harvest moisture from the air. “Sea salt was chosen as the water-absorbing compound due to its non-toxic properties and its potential to provide a sustainable option for desalination plants to dispose of the generated sea salt and brine,” shared Asst Prof Tan.

Source and image credit: <https://news.nus.edu.sg/self-charging-ultra-thin-device-that-generates-electricity-from-air-moisture/>

MIT Engineers Develop Stickers that can See Inside the Body

New stamp-sized ultrasound adhesives produce clear images of heart, lungs, and other internal organs. Ultrasound imaging is a safe and noninvasive window into the body's workings, providing clinicians with live images of a patient's internal organs. To capture these images, trained technicians manipulate ultrasound wands and probes to direct sound waves into the body. These waves reflect back out to produce high-resolution images of a patient's heart, lungs, and other deep organs.

Design by Massachusetts Institute of Technology (MIT) engineers might make the technology as wearable and accessible as buying Band-Aids at the pharmacy. The researchers applied the stickers to volunteers and showed the devices produced live, high-resolution images of major blood vessels and deeper organs such as the heart, lungs, and stomach. The stickers maintained a strong adhesion and captured changes in underlying organs as volunteers performed various activities, including sitting, standing, jogging, and biking. "We envision a few patches adhered to different locations on the body, and the patches would communicate with your cell phone, where AI algorithms would analyze the images on demand," says the study's senior author, Xuanhe Zhao, professor of mechanical engineering and civil and environmental engineering at MIT. "We believe we've opened a new era of wearable imaging: With a few patches on your body, you could see your internal organs." The team is working to make the stickers function wirelessly. They are also developing software algorithms based on artificial intelligence that can better interpret and diagnose the stickers' images. Xuanhe Zhao (author of the study) envisions ultrasound stickers could be packaged and purchased by patients and consumers, and used not only to monitor various internal organs, but also the progression of tumors, as well as the development of fetuses in the womb.



Source and image credit: <https://news.mit.edu/2022/ultrasound-stickers-0728>

China's Largest Coal-based Ethanol Project Put into Trial Operation

China's largest coal-based ethanol project with an annual output of 500,000 tonnes was put into trial operation in Yulin City in northwestern Shaanxi Province.

The project uses coal as raw material to produce ethanol and other chemical products, and it can convert 1.5 million tonnes of coal annually. Experts said three tonnes of grain can produce one tonne of ethanol, saving 1.5 million tonnes of bio-ethanol raw grain every year when in full service.

"Compared with the traditional method of producing ethanol with grain fermentation, the project firstly saves food for us and solves the problem of food security, and it is also of important and strategic significance for the high-quality utilization of coal in the future," said Li Xianfeng, deputy director of the Dalian Institute of Chemical Physics, Chinese Academy of Sciences.

Ethanol, also known as industrial alcohol, is a widely used chemical raw material that can produce more than 300 kinds of related products.

The Yulin project produces ethanol through carbonylation of dimethyl ether, an internationally leading technology with independent intellectual property rights in China.

In addition to the four methods of using coal to produce olefin, oil, natural gas and ethylene glycol, the new environment-friendly technology will boost the high-end, diversified and low carbonization development of China's coal chemical industry.



Source and image credit: <https://news.cgtn.com/news/2022-07-02/China-s-largest-coal-based-ethanol-project-put-into-trial-operation-1bkYKL9hPaw/index.html>

NASA's Webb Delivers Deepest Infrared Image of Universe Yet

NASA's James Webb Space Telescope has delivered the deepest and sharpest infrared image of the distant universe so far. Webb's First Deep Field is galaxy cluster SMACS 0723 and it is teeming with thousands of galaxies including the faintest objects ever observed in the infrared. Webb's image is approximately the size of a grain of sand held at arm's length, a tiny sliver of the vast universe. The combined mass of this galaxy cluster acts as a gravitational lens, magnifying more distant galaxies, including some seen when the universe was less than a billion years old. This deep field, taken by Webb's Near-Infrared Camera (NIRCam), is a composite made from images at different wavelengths, totaling 12.5 hours, achieving depths at infrared wavelengths beyond the Hubble Space Telescope's deepest fields, which took weeks. And this is only the beginning. Researchers will continue to use Webb to take longer exposures, revealing more of our vast universe.

This image shows the galaxy cluster SMACS 0723 as it appeared 4.6 billion years ago, with many more galaxies in front of and behind the cluster. Much more about this cluster will be revealed as researchers begin digging into Webb's data. This field was also imaged by Webb's Mid-Infrared Instrument (MIRI), which observes mid-infrared light.

Webb's NIRCam has brought distant galaxies into sharp focus, they have tiny, faint structures that have never been seen before, including star clusters and diffuse features.



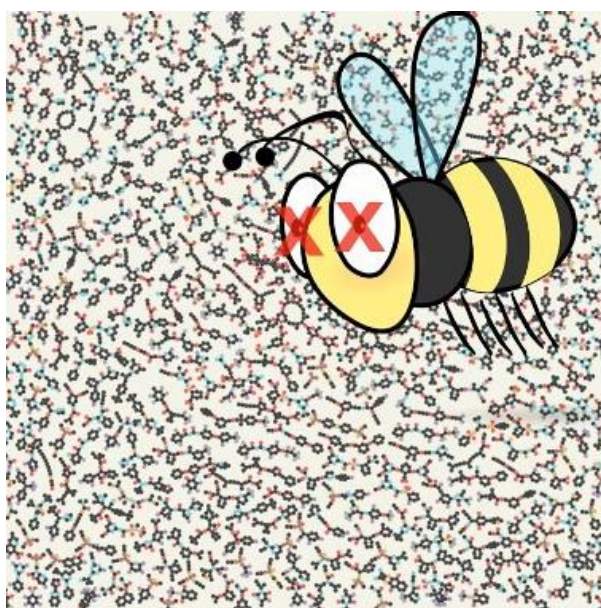
Source and image credit: <https://www.nasa.gov/image-feature/goddard/2022/nasa-s-webb-delivers-deepest-infrared-image-of-universe-yet>

A Computer Model to Predict Whether a Pesticide will Harm Bees

Researchers in the Oregon State University College of Engineering have harnessed the power of artificial intelligence to help protect bees from pesticides. Cory Simon, assistant professor of chemical engineering, and Xiaoli Fern, associate professor of computer science, led the project, which involved training a machine learning model to predict whether any proposed new herbicide, fungicide or insecticide would be toxic to honey bees based on the compound's molecular structure. The findings are important because many fruit, nut, vegetable and seed crops rely on bee pollination.

Without bees to transfer the pollen needed for reproduction, almost 100 commercial crops in the United States would vanish. Bees' global economic impact is annually estimated to exceed \$100 billion. Graduate students Ping Yang and Adrian Henle used honey bee toxicity data from pesticide exposure experiments, involving nearly 400 different pesticide molecules, to train an algorithm to predict if a new pesticide molecule would be toxic to honey bees.

"The model represents pesticide molecules by the set of random walks on their molecular graphs," Yang said. A random walk is a mathematical concept that describes any meandering path, such as on the complicated chemical structure of a pesticide, where each step along the path is decided by chance, as if by coin tosses. "The algorithm declares two molecules similar if they share many walks with the same sequence of atoms and bonds," Yang said. "Our model serves as a surrogate for a bee toxicity experiment and can be used to quickly screen proposed pesticide molecules for their toxicity."



Source and image credit: <https://today.oregonstate.edu/news/oregon-state-researchers-develop-computer-model-predict-whether-pesticide-will-harm-bees>

Future Smart Homes could be Powered with Electronics Built on Stones

What if you could power the smart thermostats, speakers and lights in your home with a kitchen countertop? Stones, such as marble and granite, are natural, eco-friendly materials that many people use in buildings or renovating houses. Now, in a step towards integrating energy storage with these materials, researchers have fabricated microsupercapacitors onto the surface of stone tiles. The devices, reported in ACS Nano, are durable and easily scaled up for customizable 3D power supplies. It would be convenient if the surfaces in rooms could charge smart home devices or other small electronics without being connected to the electrical grid.

Although stone is a widely used material for floors, countertops and decorative backsplashes, it hasn't been integrated with energy storage devices, such as batteries and capacitors. But stones, even those that are polished and seem smooth, have microscopic bumps and divots, making it difficult to adhere electrical components to them. Researchers have recently figured out how to place microsupercapacitors, which have fast charging and discharging rates and excellent power supply storage, onto irregular surfaces with lasers. So, Bongchul Kang and colleagues wanted to adapt this approach to build microsupercapacitors on marble. The researchers patterned a copper oxide nanoparticle solution on a marble tile into two comb-like sides whose prongs were interspersed. They pointed a near-infrared laser on the nanoparticles, producing pure copper electrodes that were porous, highly conductive and strongly attached to the stone's surface. To form the microsupercapacitor, the researchers deposited iron oxide onto one of the electrodes to form a cathode, and manganese oxide on the other to form an anode. The electrolyte layer connecting the electrodes was made from a lithium perchlorate and polymer solution. In tests, the device maintained a high energy storage capacity even after 4,000 charge-discharge cycles. When multiple microenergy devices were strung together in a three-by-three array, enough energy was stored to light an LED. In addition, the stone energy storage devices were exceptionally durable against harsh impacts and could be quickly recycled. The researchers say that stone microenergy devices could provide high-performance, customizable and conveniently accessible power from natural building materials.



Microsupercapacitors stone array.

Source and image credit:

<https://www.acs.org/content/acs/en/pressroom/newsreleases/2022/july/future-smart-homes-could-be-powered-with-electronics-built-on-stones.html>

A Robot Learns to Imagine Itself

Columbia Engineers build a robot that learns to understand itself, rather than the world around it. As every athletic or fashion-conscious person knows, our body image is not always accurate or realistic, but it's an important piece of information that determines how we function in the world. When you get dressed or play ball, your brain is constantly planning ahead so that you can move your body without bumping, tripping, or falling over.

A Columbia Engineering team announced today they have created a robot that, for the first time, is able to learn a model of its entire body from scratch, without any human assistance. In a new study published by *Science Robotics*, the researchers demonstrate how their robot created a kinematic model of itself, and then used its self-model to plan motion, reach goals, and avoid obstacles in a variety of situations. It even automatically recognized and then compensated for damage to its body. The researchers placed a robotic arm inside a circle of five streaming video cameras. The robot watched itself through the cameras as it undulated freely. Like an infant exploring itself for the first time in a hall of mirrors, the robot wiggled and contorted to learn how exactly its body moved in response to various motor commands. After about three hours, the robot stopped. Its internal deep neural network had finished learning the relationship between the robot's motor actions and the volume it occupied in its environment. "We were really curious to see how the robot imagined itself," said Hod Lipson, professor of mechanical engineering and director of Columbia's Creative Machines Lab, where the work was done. "But you can't just peek into a neural network; it's a black box." After the researchers struggled with various visualization techniques, the self-image gradually emerged. "It was a sort of gently flickering cloud that appeared to engulf the robot's three-dimensional body," said Lipson. "As the robot moved, the flickering cloud gently followed it." The robot's self-model was accurate to about 1% of its workspace.



Source and image credit: <https://www.engineering.columbia.edu/news/hod-lipson-robot-self-awareness>

Plasma-produced Gas Helps Protect Plants against Pathogens

The flash of lightning and the dance of auroras contain a fourth state of matter known as plasma, which researchers have harnessed to produce a gas that may activate plant immunity against wide-spread diseases. "Currently, chemical pesticides are the mainstay of disease control in agriculture, but they can contaminate the soil and harm the ecosystem," said paper author Sugihiko Ando, associate professor in the Graduate School of Agricultural Science at Tohoku University. "We need to develop plant disease control technologies that can help establish a sustainable agricultural system.

The use of plant immunity is one of the most effective disease control methods because it utilizes the innate resistance of plants and has a low environmental impact." Using their previously developed device that derives plasma from the air, the researchers produced dinitrogen pentoxide, a reactive nitrogen species (RNS). This molecule is related to reactive oxygen species (ROS), in that both damage cells and trigger specific stress responses in organisms. The researchers exposed thale cress, a small plant commonly used as a model system for scientific research, to dinitrogen pentoxide gas for 20 seconds a day for three days. The plants were then infected with one of three common plant pathogens: a fungus, a bacterium or a virus. The plants with the fungus or the virus showed suppressed progression of the pathogen, while those with the bacterium had a similar proliferation as the control plants. "These results suggest that the dinitrogen pentoxide gas exposure could control plant disease depending on the type of pathogen," Ando said. A genetic analysis revealed that the gas specifically activated the jasmonic acid and ethylene signaling pathways and appeared to lead to the synthesis of antimicrobial molecules, which Ando said may have contributed to the observed disease resistance.

"Dinitrogen pentoxide gas can be used to activate plant immunity and control plant diseases," Ando said. "Through plasma technology, the gas can be produced from air and electricity, without special materials.



Source and image credit:

https://www.tohoku.ac.jp/en/press/plasma_produced_gas_helps_protect_plants_against_pathogens_researchers_find.html

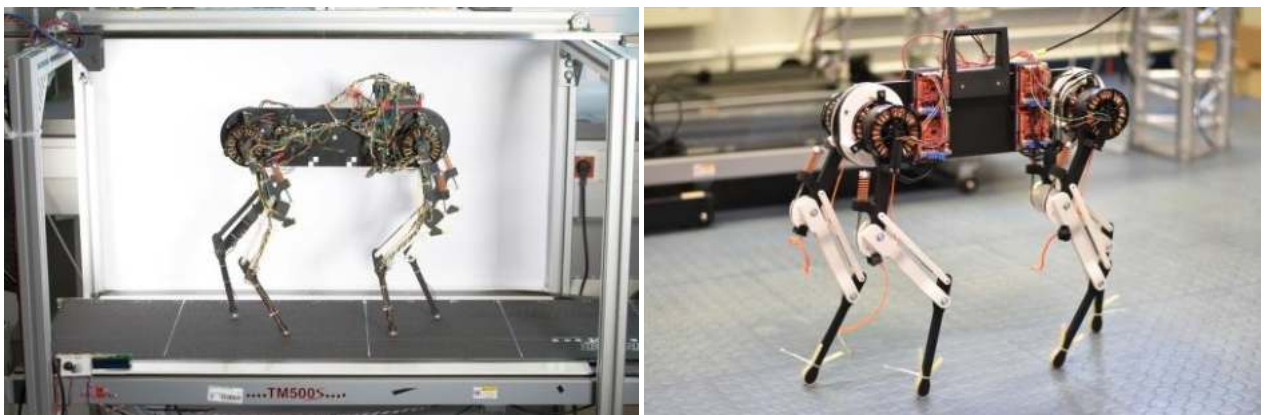
Robot dog learns to walk in one Hour

Like a newborn animal, a four-legged robot stumbles around during its first walking attempts. But while a foal or a giraffe needs much longer to master walking, the robot learns to move forward fluently in just one hour. A computer program acts as the artificial presentation of the animal's spinal cord, and learns to optimize the robot's movement in a short time. The artificial neural network is not yet ideally adjusted at the beginning, but rapidly self-adjusts. On July 18, the research work which is at the intersection of robotics and biology was published in the renowned journal Nature Machine Intelligence.

Researchers at the Max Planck Institute for Intelligent Systems (MPI-IS) in Stuttgart conducted a research study to find out how animals learn to walk and learn from stumbling. They built a four-legged, dog-sized robot that helped them figure out the details.

"As engineers and roboticists, we sought the answer by building a robot that features reflexes just like an animal and learns from mistakes," says Felix Ruppert, a former doctoral student in the Dynamic Locomotion research group at MPI-IS. "If an animal stumbles, is that a mistake? Not if it happens once. But if it stumbles frequently, it gives us a measure of how well the robot walks."

After learning to walk in just one hour, Ruppert's robot makes good use of its complex leg mechanics. A Bayesian optimization algorithm guides the learning: the measured foot sensor information is matched with target data from the modeled virtual spinal cord running as a program in the robot's computer. The robot learns to walk by continuously comparing sent and expected sensor information, running reflex loops, and adapting its motor control patterns. The learning algorithm adapts control parameters of a Central Pattern Generator (CPG). In humans and animals, these central pattern generators are networks of neurons in the spinal cord that produce periodic muscle contractions without input from the brain.



Source and image credit: <https://is.mpg.de/news/robot-dog-learns-to-walk-in-one-hour>

Deformable Pump gives Soft Robots a Heart

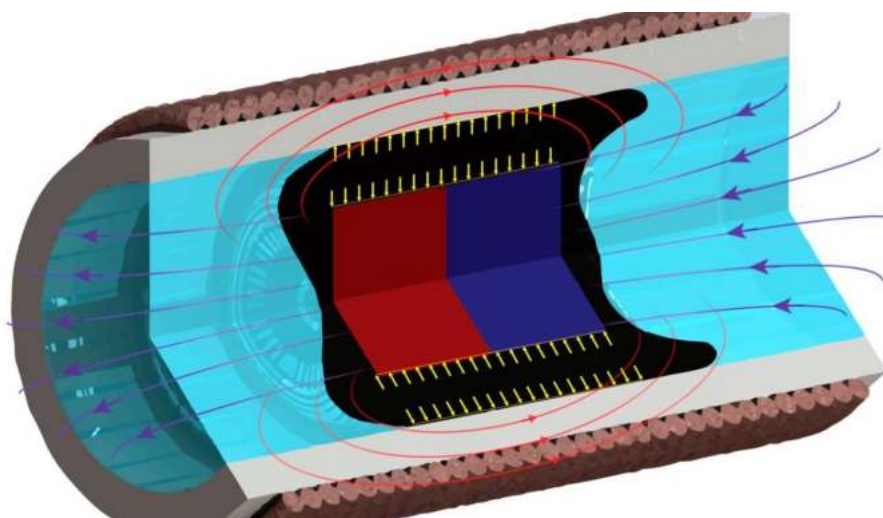
Collaboration between Cornell researchers and a U.S. research laboratory has leveraged hydrodynamic and magnetic forces to drive a rubbery, deformable pump that can provide soft robots with a circulatory system, in effect mimicking the biology of animals.

“These distributed soft pumps operate much more like human hearts and the arteries from which the blood is delivered,” said Rob Shepherd, associate professor of mechanical and aerospace engineering in the College of Engineering, who led the Cornell team.

Shepherd’s Organic Robotics Lab has previously used soft material composites to design everything from stretchable sensor “skin” to combustion-driven braille displays and clothing that monitors athletic performance – plus a menagerie of soft robots that can walk and crawl and swim and sweat. Many of the lab’s creations could have practical applications in the fields of patient care and rehabilitation.

The new elastomeric pump consists of a soft silicone tube fitted with coils of wire – known as solenoids – that are spaced around its exterior. Gaps between the coils allow the tube to bend and stretch. Inside the tube is a solid core magnet surrounded by magnetorheological fluid – a fluid that stiffens when exposed to a magnetic field, which keeps the core centered and creates a crucial seal. Depending on how the magnetic field is applied, the core magnet can be moved back and forth, much like a floating piston, to push fluids – such as water and low-viscosity oils – forward with continuous force and without jamming.

The researchers conducted an experiment to demonstrate that the pump system can maintain a continuous performance under large deformations, and they tracked the performance parameters so future iterations can be custom-tailored for different types of robots.



Source and image credit: <https://news.cornell.edu/stories/2022/07/deformable-pump-gives-soft-robots-heart-0>

FORTHCOMING TECH EVENTS

PAKISTAN

- 1st International Conference on Climate Resilient Agriculture for Sustainable Development & Food Security
September 5 – 7, 2022, Allama Iqbal Open University, Islamabad
<https://iccra.aiou.edu.pk/>
- 3rd Young Scientists Research Conference
September 28th, 2022, Foundation University School of Health Sciences, Islamabad
<https://fui.edu.pk/3YSRC/#location>
- International Conference Revamped Scientific outlook of 21st Century
October 12th, 2022, Rawalpindi Women University, Rawalpindi
<https://conf-fs2022.rwu.edu.pk/conference-themes/>
- International Conference on Recent Advances in Electrical Engineering & Computer Sciences
October 18 – 20, 2022, Pakistan Institute of Engineering and Applied Sciences, Islamabad
http://www.pieas.edu.pk/images/_proclaim-images/101/_proclaim-101-pdf.pdf
- 1st International Conference and 4th Workshop on Materials Modeling and Simulations
October 24 – 26, 2022, University of Malakand, Khyber Pakhtunkhwa
<https://uom.edu.pk/icwmms2022/>
- 1st International Conference on Sports, Exercises and Health Sciences
October 25 – 26, 2022, Gomal University, Dera Ismail Khan
<http://www.gu.edu.pk/International-Conference-Sports/International-Conference-Sports.asp#speaking-opportunities>

INTERNATIONAL

- International Conference on Machine Learning and Data Engineering
September 7 – 8, 2022, Dehradun, India
<http://www.icmlde2022.com/>
- 8th International Conference on Computer Science, Engineering and Information Technology (CSITY 2022)
September 24 – 25, 2022, Toronto, Canada
<https://csity2022.org/index>
- Meteorological Technology World Expo
October 11 – 13, 2022, Paris, France
<https://www.meteorologicaltechnologyworldexpo.com/en/>
- International Conference on Engineering, Science and Technology (IConEST)
October 13 – 16, 2022, Austin, USA
<https://www.2022.iconest.net/>
- 6th International Conference on Modern Research in Engineering, Technology & Science
October 14 – 16, 2022, Prague, Czech Republic
<https://www.icmets.org/>
- 15th International Conference on Computer Science and Information Technology (ICCSIT 2022)
October 14 – 16, 2022, Tokyo, Japan
<http://iccsit.org/>
- 11th International Conference on Computer Technologies and Development
October 16 – 18, 2022, Barcelona, Spain
<http://www.icctd.org/>

TECH AND TRADE OFFERS

Gadoon Textile Mills Limited

About Gadoon Textile Mills Limited

We operate primarily in the textile industry of Pakistan, the fiber spinning sector in particular.

We manufacture and process all types of cotton and man-made fibers, thus operating in the B2B sector of the industry. Our clients include some of the biggest names in the textile industry of Pakistan and abroad. We enjoy relationships that have been forged, maintained and strengthened during the past twenty nine years of our operations history.

Our Products

➤ **Poly Cotton Yarn**

In this type of *yarn* the cotton part is usually less than Polyester. The poly cotton yarn commonly has a blend of polyester and cotton. Two of the most frequently sold blends in polyester cotton yarn are of 65:35 and 52:48.



➤ **Murata Vortex Spun Yarn (MVS)**

Vortex yarn is spun with a unique technology. Its yarn structure optimizes the characteristics of its component fibers.

The features of Vortex yarn include, less hairiness, resistance to pilling, moisture absorption, and wash resistance.



➤ **Slub Yarn**

Slub yarn refers to yarn that has been purposely spun with slubs (thicker sections along the yarn). Slubs are deliberately created to produce a desired effect.



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Reliable Innovative Technologies

About Reliable Innovative Technologies

Reliable Innovative Technologies is a software company that is providing websites and custom software development according to business needs, while principally focusing on the simplicity and friendly behavior of the software.

Our mission is to improve the business growth of our customers with productive plan and advancement to address market-defining high-quality resolutions. We help our consumers to derive enhanced value from their information technology investment being IT consultancy, IT solutions etc. Our aim is always to create values.

Our Products**➤ Reliable School Software**

Reliable School Software is designed to speed up various tasks across the institution system and offers modules from student robust features that benefit educators, students, and staff. An online ERP solution that can be accessed anytime, anywhere



Reliable School Software provides a verity of school management related services including Student Admission Module, Easy Attendance Management, School Fees Management, Time Table Management, Subject Setup & Management, Expense Management, Staff Management etc.

➤ Reliable Housing Management Software

Reliable Housing Management is a comprehensive and modern housing society management software for small scheme businesses & real estate sectors. It has been designed for people as well as business as focal points. It is developed to assist your office staff with day to day society operations management and to give unique reporting to purchase. It assists you with end-to-end management of processes such as plots sales & purchase, registration, payment installments management and much more.

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Please give us your feedback and address queries to tis.pastic@gmail.com