

Technology Roundup

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3rd International Conference on
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Tech & Trade Offers

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NADRA Joins Top Global Biometric Identification Technology Providers

NADRA has joined the ranks of premier biometric identification technology providers worldwide with the launching of its cutting-edge Automated Finger Identification System (AFIS) for civil purposes. Branded as “NADIR”, NADRA achieved a significant milestone by indigenously developing and incorporating this state-of-the-art AFIS into its suite of technology solutions. Indigenous development of AFIS is a groundbreaking development not only in the field of civil identification but in the pursuit of nation building as well.

With its advanced technology, we can now accurately and quickly store fingerprints and identify individuals for a wide range of purposes as a public good, from immigration to border control to social services.

NADIR, as a pioneering achievement in the field of biometric identification technology, underscores the organization's commitment to innovation and further solidifies its position as a global leader in advanced identity management solutions. The indigenous development of AFIS technology represents a major advancement in the field of biometrics, utilizing the unique characteristics of fingerprints to establish a robust and reliable method of identity verification.

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Source: <https://www.thenews.com.pk/latest/1062147-nadra-launches-cutting-edge-identification-system-nadir>

Image credit: <https://www.nadra.gov.pk/>

Four Excellence Hubs of Renewable Energy to be Established in Punjab and KP

The provincial governments of Punjab and Khyber Pakhtunkhwa will establish four excellence hubs of renewable energy with the help of German grant of 9.8 million Euros. The KfW Development Bank (Kreditanstalt für Wiederaufbau), Germany has agreed to sanction a grant amounting to 9.8 million Euros for establishment of four excellence hubs of renewable energy out of which two hubs will be established in the PTEVTA institutions of Punjab while two will be established in KP TEVTA. In Punjab province one excellence hub in Lahore and one district Rawalpindi will be established at the cost of Rs 1117.403 million.

The share of foreign funding for the project is Rs 844.345 million, while Rs 273.058 million is being funded from the local ADP of Punjab, said the documents. This project is aimed to introduce two excellence hubs of renewable energy for exploring new avenues in view of the demand and supply issues in energy sector. The feasibility report was received

from KfW Development Bank dated Jan 2022 wherein renewable energy hubs are proposed to be established in the premises of two TEVTA Institutes i-e Govt. College of Technology (GCT), Taxila and Govt. Apprenticeship Training Center (GATC), Township, Lahore as



service center similar to the already existing service centers in Punjab.

It is further highlighted in the feasibility study that expenses on the Civil & Revenue Components of the scheme is the responsibility of kfw Development Bank while Hub-hosting institutes construction upgrades and OPEX for Hubs are the responsibility of local government of Punjab.

Source: <https://www.nation.com.pk/22-Apr-2023/punjab-kp-govts-to-establish-four-excellence-hubs-of-renewable-energy>

Image credit: <https://envirocivil.com/environment/renewable-energy-resources-pakistan/>

School Eye Health Screening Programme Initiated in GB

Sightsavers is initiating the project of ‘School Eye Health Screening’ in Gilgit Baltistan to ensure eye health to and strengthen its commitment to the people of GB. For this, a Letter of Understanding (LoU) has been signed between the Sightsavers and Government of Gilgit Baltistan. School eye health screening programme initiated in GB. The project will provide screening facilities to the school going children in Gilgit-Baltistan for common eye problems, provide free glasses for the children with refractive error and also surgical treatment in partnership with department of health. The project will also provide ophthalmic screening equipment for the screening team. Furthermore, the project aims commitment for the establishment of a Low Vision and IT Resource Centre in Special Education Complex of GB.

Chief Secretary of Gilgit-Baltistan, Mohyuddin Ahmed Wani said that this project is addressing one of the most pressing challenges of eye health of school going children and unavailability of proper screening facilities. The project is materializing the Government’s vision of making health facilities available for everyone at grassroot level. Munazza Gillani, Country Director, Sightsavers said that they are working to eradicate avoidable blindness and promote the rights of people with disabilities. This project will make a significant contribution to the refractive services, effective scaling up of screening and eyeglasses provision and will promote the integration of these approaches into government-led national programs.



Source: <https://www.thenews.com.pk/print/1055068-school-eye-health-screening-programme-initiated-in-gb>

Image credit: <https://www.technologytimes.pk/2023/03/28/sightsavers-initiating-school-eye-health-screening-program-in-gb/>

Establishment of a Training Center for the Usage of Drone Technology for Precision Agriculture in Punjab

A Memorandum of Understanding (MoU) has been signed between Onnuri Unmanned Aerial Vehicle Company South Korea and Pir Mehr Ali Shah-Arid Agriculture University Rawalpindi (PMAS-AAUR) to establish a training center for the usage of drone technology in precision agriculture and related fields.

Vice Chancellor PMAS-AAUR, Prof. Dr. Qamar-uz-Zaman termed it a milestone for the country in popularizing the drone technology in agriculture and related fields. The center would not only provide trained manpower for unmanned aerial vehicles locally but also create job opportunities for Pakistani youth internationally. This important center would strengthen industry academia ties to promote modern agricultural technology and resolve the issues being faced by the farmers.

Precision agriculture is a key to increase per-acre production, eliminate poverty and ensure food security. The VC said that PMAS-AAUR had established a smart IoT Farm with an aim to promote digital and precision agriculture in the country which would enable Pakistan to not only become self-sufficient in agricultural production but also realize the dream of exporting agricultural products.



Source: <https://dailybalochistantimes.com/rawalpindia-memorandum-of-understanding-mou-has-been-signed-between>

Image credit: <https://dailytimes.com.pk/879163/na-body-recommends-policy-for-use-of-drone-technology>

Pakistani Computer Operator Uses AI Technology to Visualize Civilization of Mohenjo Daro

A computer operator, from a remote village in Pakistan's southern Sindh province, has used Artificial Intelligence (AI) to re-imagine life in Mohenjo Daro which is one of the most striking archaeological sites. Rehmatullah Mirbahar, 34 years old, computer operator at Thatta District Health Department, used websites and YouTube tutorials to teach himself how to create art using AI tools. Mirbahar, who invested almost three months learning AI, said the inspiration was to show the world how people lived in the ancient city of Mohenjo Daro and what kind of lifestyle they had.

Artificial intelligence was an ideal choice for his objectives because it could produce results based on available online data about a place or its people, and where it didn't match reality, a human mind could intervene. And he had to intervene on numerous occasions by drawing from his knowledge and the photography he had done in the ruins of Mohenjo Daro and other ancient sites in Sindh to learn more about the area's ancient architecture and culture. It gives fifty or sixty percent results based on the data it has and hence it needs modification. For examples, how the faces of people appear, we have to fix their faces, have to change their colors, and the rest of the modifications are done with the help of AI.

While on the other hand, some people criticized that there should be a river that flowed here, likewise, there should be greenery. In future, an update to "Mohenjo Daro version two" is expected by Mirbahar.



Image credit and source: <https://www.arabnews.pk/node/2282191/pakistan>

Fully Automatic Fumigation and Disinfection Device Invented by a Pakistani Engineer

Recently, a Pakistani Engineer, Mr. Mubeen Fareed claimed to invent a machine that performs disinfection and fumigation automatically. According to Fareed, this invention is first of its kind in the world as the previously made machines for the purpose of disinfection and fumigation operate manually. In the same way, fog produced through conventional thermal fogger, for killing mosquitoes and other insects creates too much noise, cannot be used every where (indoor) and consumes fuel for working. On the other hand, newly designed machine by Fareed is fully electric, can be used indoor as well and has a sound equal to the sound of a mobile phone ring tone. Both, disinfection and fumigation jobs can be done by this machine automatically. The conventional one works only when a trained professional operates it and changes the chemicals manually each time.

Once this newly designed machine is refilled, it can perform 22 fumigation and 25 disinfection rounds. The operator only has to select any one of the task, either fumigation or disinfection, the machine automatically selects and mixes the chemicals to perform the respective task. Furthermore, fog/droplets rate can also be increased or decreased as needed. Usually, this machine covers an area of 5,000 cubic feet in just a minute which is enough for most of the tasks to be performed. The device is also equipped with a timer of 2, 5 and 10 minutes to fumigate large areas (for examples garages). Several security features are also mounted on this machine to make it fail-safe. Mr. Fareed has designed two models before this final form of the product and invested a long time in it. The machine can be utilized in schools, colleges, hospitals, government organizations, banks, bakeries, kitchens, restaurants and for domestic & commercial purposes.



Image credit and source:

<https://www.facebook.com/groups/PakistanStartups/permalink/5912496542132795/>

Aeroponic Technology Started by NARC for Potato Seed Production

Pakistan's dependence on imported potato seed is now set to substantially reduce with the application of aeroponics technology introduced in the country with the assistance of South Korea, as the second crop of potato seed is now ready to be harvested at the National Agricultural Research Centre (NARC) in Islamabad.

The Aeroponic potato seed production system will result in farm level processing, higher productivity, post-harvest losses reduction, human resource development along with immense job opportunities.

Over 30 percent of the seed requirements can be met from tissue culture labs of NARC. According to Dr. Ghulam Muhammad Ali, Chairman Pakistan Agricultural Research Council, Aeroponic technology offers the potential to improve production and reduce costs compared to conventional methods or other soilless methods. In Pakistan, potato seed is mostly imported from Holland which is not only costly but also the above fifth generation which negatively affects potato productivity. Through this technique, Pakistan can not only improve the productivity but it can also be proved cost effective.



Source: <https://www.thenews.com.pk/print/1053967-parc-uses-aeroponics-technology-to-boost-potato-production>

Image credit: <https://ruralmarketing.in/stories/aeroponic-technology-revolutionising-potato-seed-production/>

Pakistan and China Established a Joint Wheat Breeding Research Lab in Islamabad

Pakistan and China established the project of Pakistan-China Wheat Molecular Breeding International Lab to work jointly.

The Science and Technology Partnership Program, Ministry of Science and Technology of China has funded the project with the joint support from China's Ministry of Agriculture and Rural Affairs, the International Maize and Wheat Improvement Center (CIMMYT) and National Agriculture Research Center of Pakistan.

The joint lab will conduct collaborative research on molecular breeding, test select Chinese germplasm in Pakistan, train scientists and organize workshops. The lab is aimed to develop new varieties having high yield and being disease resistant and enhancing the capacity of breeders and technical staff so as to increase the breeding capacity and production of wheat in Pakistan. The Joint Lab will become a wheat breeding platform between Pakistan and China to provide scientific and technological support for Pakistan's food security.

The launching event was held online and offline at the Institute of Crop Sciences, Chinese Academy of Agricultural Sciences (CAAS) and Quaid-i-Azam University (QAU) Islamabad in Pakistan. More than 30 scientists and researchers from both sides attended the launching ceremony.

Dr. Sarwat Jahan, the dean of Biological Sciences, welcomed this initiative at the inauguration ceremony and emphasized that QAU will support the lab's joint activities. According to Dr. Zhouhua Cao, First Secretary of the Chinese Embassy in Pakistan, China has consistently offered cooperation to Pakistani scientists and engineers, and the new joint lab will receive all the support required from the Chinese Embassy.



Source: http://en.ce.cn/Insight/202303/07/t20230307_38429266.shtml

Image credit: https://aari.punjab.gov.pk/crop_varieties_wheat

COMSATS Signs LoI for Cooperation in Science and Technology

The Commission on Science and Technology for Sustainable Development in the South (COMSATS) signed a Letter of Intent (LoI) with the World Business Angels Investment Forum (WBAF) to initiate a process towards formalizing cooperation in science and technology through a subsequent MoU. The MoU, would be a framework aimed at supporting academics, R&D institutions, research scholars, start-ups, innovators and entrepreneurs in COMSATS member states.

The LoI was signed by Ambassador Dr. Mohammad Nafees Zakaria, Executive Director COMSATS, and Mr. Baybars Altuntas, Chair WBAF, on behalf of their respective organizations. Federal Secretary, Ministry of Science and Technology, Mr. Ghulam Muhammad Memon, was the Chief Guest on the occasion. He along with Ambassador Shahid Kamal, a seasoned diplomat, who has served as Advisor to the COMSATS, witnessed the signing ceremony.

COMSATS is an intergovernmental organization of 27 developing countries with its Secretariat hosted in Islamabad by the Government of Pakistan. Founded in 1994, with the objective of bridging the knowledge and technological gap between the global North and South, an idea propounded by Pakistani Nobel Laureate and Theoretical Physicist Prof. Dr. Abdus Salam, COMSATS has embarked on a journey with greater thrust on promoting innovations, R&D, entrepreneurship and aligning research with the industry.



Image credit and source: <https://leadpakistan.com.pk/news/comsats-and-world-business-angels-investment-forum-to-cooperate-and-collaborate-in-st-sign-loi/>

A Body Heat Powered Flashlight Developed by Citizen of Lodhran, Punjab

Mohammad Wasim, a citizen of Lodhran, Punjab, has made a magnificent achievement in the field of technology. The young man has invented a flashlight that works through the human body temperature.

According to Wasim, this innovative flashlight lights up when we hold and bring it in contact with a body part, for example, forehead. The idea of this flashlight hit Wasim's mind when he realized the significance of a flashlight when battery-powered or charging flashlights were not available or fail to work as in load shedding situation.

He said, in the future, this technology can be used by our security forces in remote areas. This new invention is not only practical but also eco-friendly as it eliminates the need for batteries, charging or solar panels.

Wasim's creativity and resourcefulness has proved impressive and resulted in overwhelmingly positive response for creation of this human heat powered flashlight. This innovation is supposed to bring appreciation and recognition for his city also.



Depending upon the environment and activity, the human body gives off about 290 and 3800 kilojoules of thermal energy per hour as a waste product of our body using the food we eat. That means human body gives off enough heat energy to power a light bulb all of the time.

Image credit and source: <https://www.samaaenglish.tv/news/40026648> and <https://mithras.tech/2019/04/17/can-human-body-heat-provide-the-world-with->

Energy-Efficient, Low-Cost Food Appliances Developed by Karachi University Students

During a recent food equipment expo, hosted on campus by University of Karachi, students from the Food Science & Technology Department displayed a wide range of inexpensive and energy-efficient appliances meant to cook and preserve food.

Haris Kamran's air fryer, which distributes hot air around meals with barely a drop of oil, was a notable creation. Kamran stated that he created the machine with a cost of only Rs. 9,000 and that it has a maximum temperature of 160 degrees, making it a healthier substitute to regular fryers. By circulating hot air around the food, the air fryer can cook food quickly and evenly, without the need for large amount of oil. This can significantly reduce the amount of fat and calories in the food, making it a healthier option for those who love fried foods.

Sohaib Malik's mini refrigerator was also an excellent product since he designed it with an eco-friendly thermoelectric microchip that utilizes less harmful gas than standard refrigerators. The mini refrigerator, as per Malik, can achieve temperature as low as -12 degrees Celsius.

Another important creation was Ariba Khan's dough kneading machine, which can knead more than 5 kg of flour in just a few minutes through its 250-volt gear motor. Khan revealed that she spent Rs. 10,000 on the prototype. This can save time and effort for those who work with large amounts of dough, such as bakers and chefs. The use of a motor also makes the device more energy-efficient, as it requires less physical effort to knead the dough. This can reduce the amount of energy required to make large batches of bread or other baked goods, making it a more sustainable and cost-effective option for commercial kitchens and bakeries.

The expo featured 13 projects, and different organizations expressed interest in working with the participants to advance their innovations.



Image credit and source: <https://propakistani.pk/2023/03/02/karachi-university-students-develop-energy-efficient-low-cost-food-appliances/>

Eyeglasses Capable of Reading Silent Speech through AI

Eyeglasses called, EchoSpeech, use acoustic sensing and artificial intelligence to continuously recognize up to 31 unvocalized commands, based on lip and mouth movements. Developed by Cornell University's Smart Computer Interfaces for Future Interactions (SciFi) Lab, wearable, low-power, interface works by just a few minutes of user training data to recognize commands and can be run on a smartphone.

For people who cannot vocalize sound, this silent speech technology could be an excellent input for a voice synthesizer. It could give patients their voices back.

In its present form, EchoSpeech could be used to communicate with others via smartphone in places where speech is inconvenient or inappropriate, like a noisy restaurant or quiet library. The silent speech interface can also be paired with a stylus and used with design software like CAD, all but eliminating the need for a keyboard and a mouse.

Outfitted with a pair of microphones and speakers smaller than pencil erasers, the EchoSpeech glasses become a wearable AI-powered sonar system, sending and receiving soundwaves across the face and sensing mouth movements. A deep learning algorithm, also developed by SciFi Lab researchers, and then analyzes these echo profiles in real time, with about 95% accuracy. According to the developers of EchoSpeech, the device moves sonar onto the body. It's small, low-power and privacy-sensitive, which are all important features for deploying new, wearable technologies in the real world.



Acoustic-sensing technology like EchoSpeech removes the need for wearable video cameras. And because audio data is much smaller than image or video data, it requires less bandwidth to process and can be relayed to a smartphone via Bluetooth in real time.

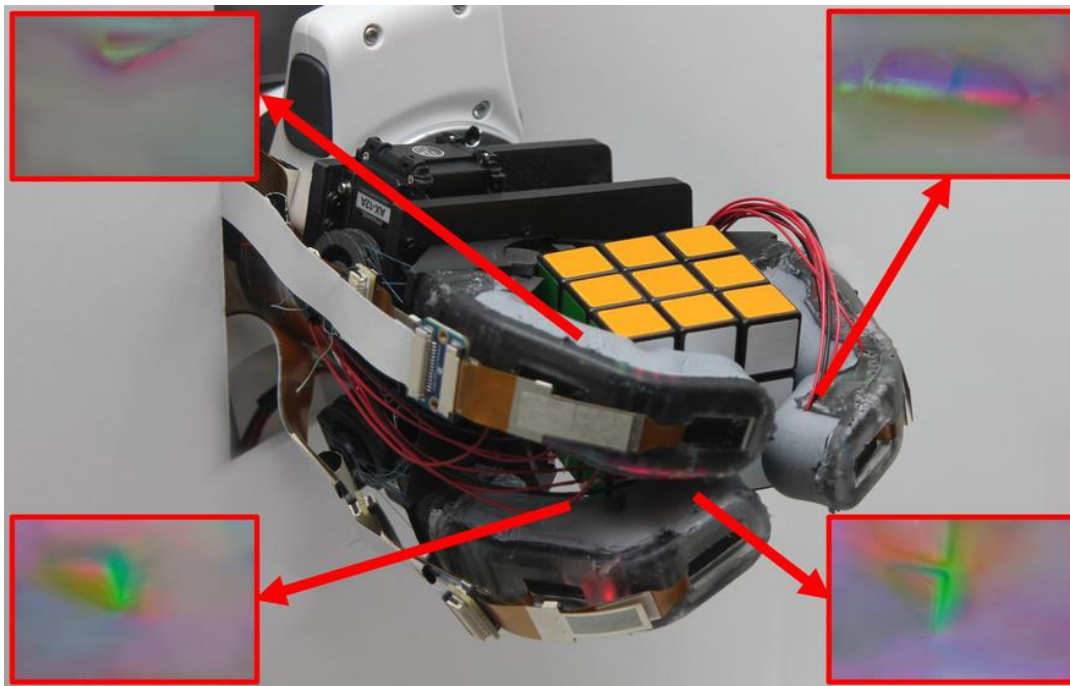
Image credit and source: <https://news.cornell.edu/stories/2023/04/ai-equipped-eyeglasses-can-read-silent-speech>

Robotic Hand can Identify Objects with Just a Grasp

The three-fingered robotic gripper can feel with great sensitivity not just at the tips but along the full length of each finger. Inspired by the human finger, Massachusetts Institute of Technology (MIT) researchers have developed a robotic hand that uses high-resolution touch sensing to accurately identify an object after grasping it just one time.

Many robotic hands pack all their powerful sensors into the fingertips, so an object must be in full contact with those fingertips to be identified, which can take multiple grasps. Other designs use lower-resolution sensors spread along the entire finger, but these don't capture as much detail, so multiple re-grasps are often required.

Instead, the MIT team built a robotic finger with a rigid skeleton encased in a soft outer layer that has multiple high-resolution sensors incorporated under its transparent "skin." The sensors, which use a camera and LEDs to gather visual information about an object's shape, provide continuous sensing along the finger's entire length. Each finger captures rich data on many parts of an object simultaneously.



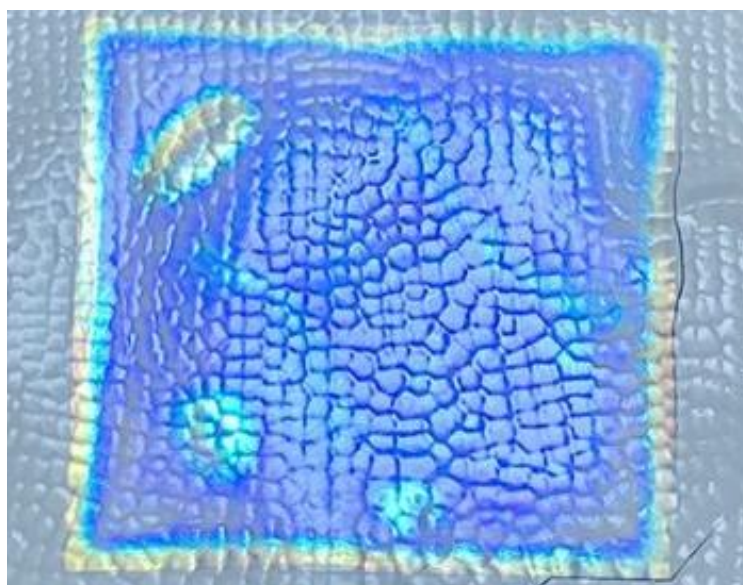
Using this design, the researchers built a three-fingered robotic hand that could identify objects after only one grasp, with about 85 percent accuracy. The rigid skeleton makes the fingers strong enough to pick up a heavy item, such as a drill, while the soft skin enables them to securely grasp a pliable item, like an empty plastic water bottle, without crushing it.

Image credit and source: <https://news.mit.edu/2023/robotic-hand-can-identify-objects-just-one-grasp-0403>

Colorful Films could Help Buildings and Cars to Keep Cool

The cold blast of an air conditioner (AC) can be a relief when temperature rises, but AC units leak potent greenhouse gases and require large amounts of energy. According to a new research, scientists have reported an eco-friendly alternative, plant-based film that on exposure to sunlight gets cooler and comes in a variety of textures and bright, iridescent colors. The material could someday keep cars, buildings and other structures cool without external power. According to the principal investigator of the research, Dr Silvia Vignolini, making materials that remain cooler than the air around them during the day, we need something that reflects a lot of solar light and doesn't absorb it, which would transform energy from the light into heat. There are only a few materials that have this property, and adding color pigments would typically undo their cooling effects.

Passive daytime radiative cooling (PDRC) is the ability of a surface to emit its own heat into space without it being absorbed by the air or atmosphere. The result is a surface that, without using any electrical power, can become several degrees colder than the air around it. When used on buildings or other structures,



materials that promote this effect can help limit the use of air conditioning and other power-intensive cooling methods. Part of this research focuses on identifying the causes behind different types of structural colors in nature. In one case, researchers found that cellulose nanocrystals (CNCs), which are derived from the cellulose found in plants, could be made into iridescent, colorful films without any added pigment. In recent work, scientists layered colorful CNC materials with a white-colored material made from ethyl cellulose, producing a colorful bi-layered PDRC film. They made films with vibrant blue, green and red colors that, when placed under sunlight, were an average of nearly 7 F cooler than the surrounding air.

Image credit and source: <https://www.acs.org/pressroom/newsreleases/2023/march/colorful-films-could-help-buildings-cars-keep-their-cool.html>

AI Based Technology Monitors the Health of Elderly Residents at Homes



The AI based system can effectively monitor activities of elderly persons such as eating, sleeping and frequency of bathroom use. Engineers are using artificial intelligence (AI) and wireless technology to monitor elderly people in their living spaces and provide early detection of emerging health problems.

The new system, built by researchers at the University of Waterloo, follows an individual's activities accurately and continuously by gathering vital information without using any wearable device and alerts medical experts to step in for help.

After more than five years of working, scientists have demonstrated that very low-power, millimetre-wave radio systems enabled by machine learning and artificial intelligence can be reliably used in, hospitals, homes and long-term care facilities. The system can also alert healthcare workers in case of sudden falls. This technology works without the need of camera which is considered to be a privacy-intrusive device.

The new system represents a major step forward and works by first, sending low-power waveforms through wireless transmitter across an interior space, such as apartment, home, or a long-term care room. As the waveforms bounce off different objects and the people being monitored, they're captured and processed by a receiver. That information goes into an AI engine which deciphers the processed waves for detection and monitoring applications. The system, which employs extremely low-power radar technology, can be mounted simply on a ceiling or by a wall and doesn't suffer the drawbacks of wearable monitoring devices, which can be uncomfortable and require frequent battery charging.

Image credit and source: <https://uwaterloo.ca/news/media/new-home-ai-tool-monitors-health-elderly-residents>

A Solar Hydrogen System that Co-generates Heat and Oxygen

Researchers from EPFL (Ecole Polytechnique Fédérale de Lausanne) have constructed a pilot-scale solar reactor that produces hydrogen with a size-unprecedented level of efficiency while also producing useable heat and oxygen. The EPFL campus has a unique parabolic dish that functions like an artificial tree. A reactor above the dish uses sunlight concentrated approximately 1,000 times to transform water into useful and renewable hydrogen, oxygen, and heat.

This is the first system-level demonstration of solar hydrogen generation. Unlike typical lab-scale demonstrations, it includes all auxiliary devices and components, so it gives us a better idea of the energy efficiency you can expect once you consider the complete system, and not just the device itself.

Hydrogen production from water using solar energy is referred to as artificial photosynthesis, but the LRESE system is unique for its ability to also produce heat and oxygen at scale. After the dish concentrates the sun's rays, water is pumped into its focus spot, where an integrated photoelectrochemical reactor is housed. Within this reactor,

photoelectrochemical cells use solar energy to electrolyze, or split water molecules into hydrogen and oxygen. Heat is also generated, but instead of being released as a system loss, this heat is passed through a heat exchanger so that it can



be harnessed. In addition to the system's primary outputs of hydrogen and heat, the oxygen molecules released by the photo-electrolysis reaction are also recovered and used.

The system could be used to provide residential and commercial central heating and hot water, and to power hydrogen fuel cells. At an output level of about half a kilogram of solar hydrogen per day, the EPFL campus system could power around 1.5 hydrogen fuel cell vehicles.

Image credit and source: <https://actu.epfl.ch/news/a-solar-hydrogen-system-that-co-generates-heat-and/>

Thread-Like Pumps Can Be Woven Into Clothes

EPFL researchers have developed fiber-like pumps that allow high-pressure fluidic circuits to be woven into textiles without an external pump. Soft supportive exoskeletons, thermoregulatory clothing, and immersive haptics can therefore be powered from pumps sewn into the fabric of the devices themselves.

Many fluid-based wearable assistive technologies today require a large and noisy pump that is impractical – if not impossible – to integrate into clothing. This leads to a contradiction: wearable devices are routinely tethered to un-wearable pumps. Now, researchers at the Soft Transducers Laboratory (LMTS) in the School of Engineering have developed an elegantly simple solution to this dilemma. We present the world's first pump in the form of a fiber; in essence, tubing that generates its own pressure and flow rate. Now, we can sew our fiber pumps directly into textiles and clothing, leaving conventional pumps behind. The fiber format allows us to make lighter, more powerful pumps that are inherently more compatible with wearable technology. To achieve the pump's unique structure, the researchers developed a novel fabrication technique that involves twisting copper wires and polyurethane threads together around a steel rod, and then fusing them with heat. After the rod is removed, the 2 mm fibers can be integrated into textiles using standard weaving and sewing techniques.



Image credit and source: <https://actu.epfl.ch/news/thread-like-pumps-can-be-woven-into-clothes-4/#:~:text=EPFL%20researchers%20have%20devel>

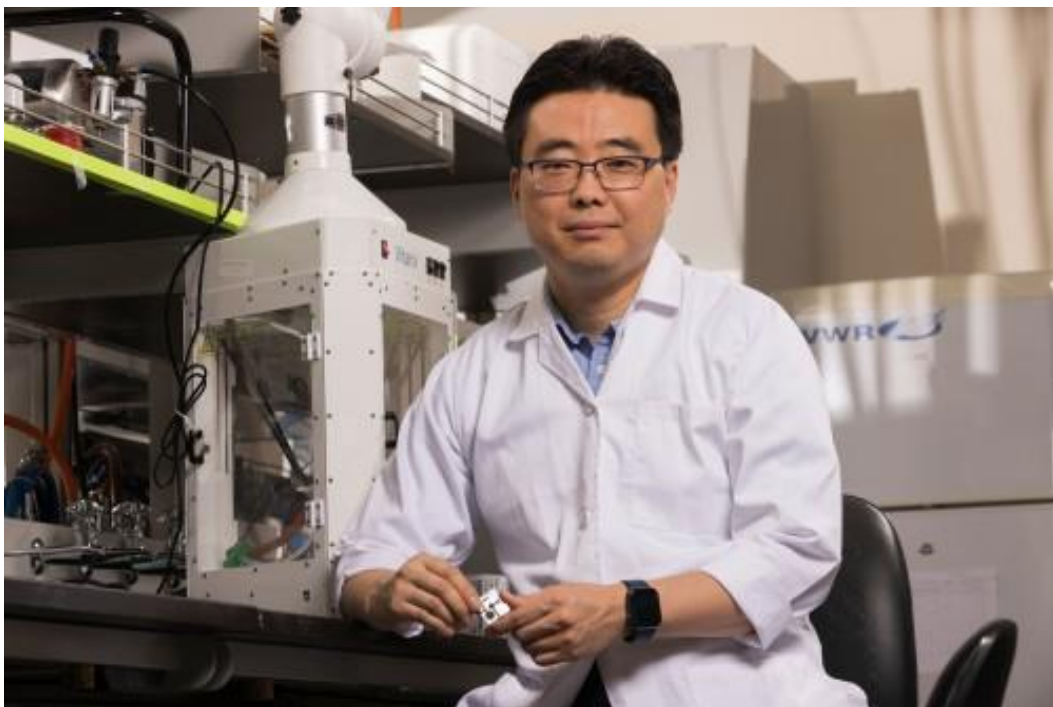
Tiny Bio-battery with 100-Year Shelf Life Runs on Bacteria

A tiny biobattery that could still work after 100 years has been developed by researchers at Binghamton University, State University of New York. The study shares the results from using spore-forming bacteria similar to the ingestible version to create a device that potentially would still work after 100 years.

The dime-sized fuel cell was sealed with a piece of Kapton tape, a material that can withstand temperatures from -500 to 750 degrees Fahrenheit. When the tape was removed and moisture allowed in, the bacteria mixed with a chemical germinant that encouraged the microbes to produce spores. The energy from that reaction produced enough to power an LED, a digital thermometer or a small clock.

The overall objective was to develop a microbial fuel cell that can be stored for a relatively long period without degradation of biocatalytic activity and also can be rapidly activated by absorbing moisture from the air.

Heat activation of the bacterial spores cut the time to full power from 1 hour to 20 minutes and increasing the humidity led to higher electrical output. After a week of storage at room temperature, there was only a 2% drop in power generation.



Binghamton University Professor Seokheun Sean Choi

Image credit and source: <https://www.newswise.com/articles/tiny-biobattery-with-100-year-shelf-life-runs-on-bacteria>

Jellyfish-Inspired Robots to Clean Ocean Beds

Jellyfish and octopus have frequently served as an inspiration for soft robotics, especially when it comes to designing appendages that can delicately handle fragile objects. Now, the experts over at Max Planck Institute for Intelligent Systems (MPI-IS) have designed a jellyfish-inspired robot that can collect objects from the waterbed without physically touching them. Called "Jellyfish-Bots," the robot only needs 100mW of electricity, which means it doesn't pose any harm to humans or aquatic life, even if the insulating layer around the body wears off.

"Jellyfish-Bot interacts gently with its environment without disturbing it says the team behind this unique robot. The robot, which is nearly the size of a hand and almost noise free, relies on electrohydraulic actuators, which maintain electrical flow and also serve as the muscles that regulate movement. These muscles, also known as HASELs, are surrounded by air cushions for stabilization towards underwater movement, and also serve as a layer of protection for the internal circuitry.

The artificial muscles contract and relax through periodic electric currents flowing through the wires, allowing the robot to swim through the water. As the Jellyfish Bot moves, it also circulates the water around, which makes it easier to agitate everything from plastic waste to fragile marine samples above the sea bed, and lift them up to the surface.

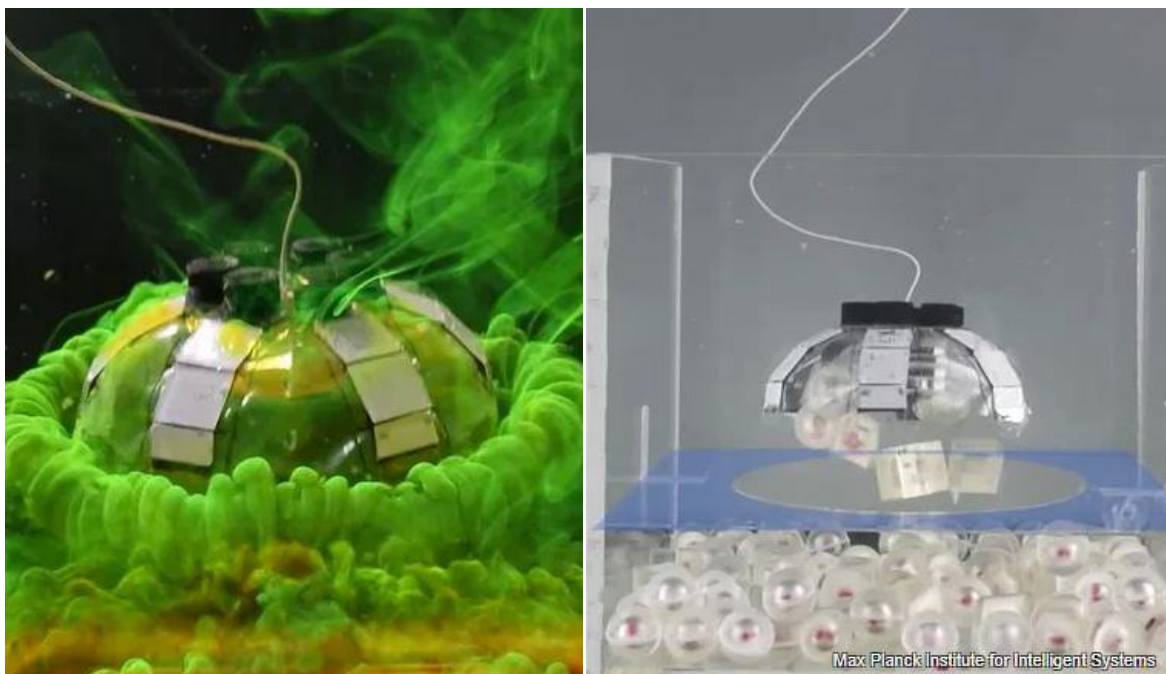


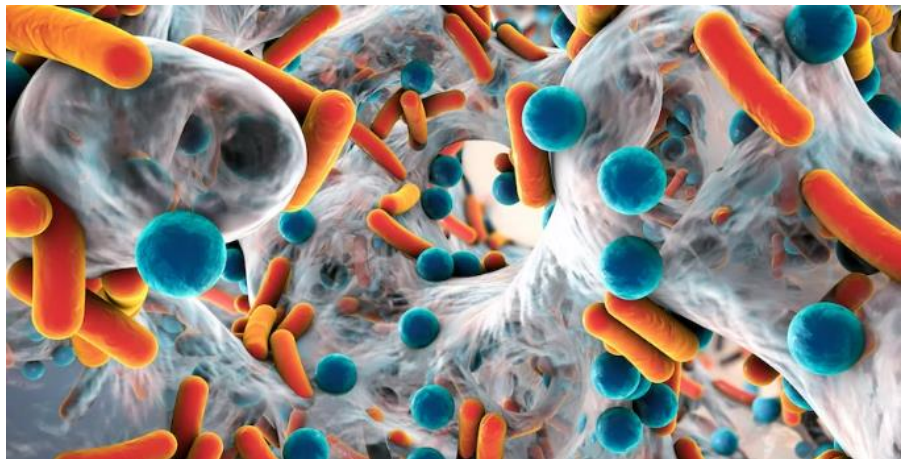
Image credit and source: <https://www.slashgear.com/1268118/jellyfish-inspired-robots-may-clean-ocean-beds-without-touching-trash/>

Fast and Cheap Method for Detecting Antimicrobial Resistance Could Improve Infectious Disease Care

Researchers have developed a fast, cheap, and simple method for detecting antimicrobial resistance that could prove particularly attractive in lower-income countries. Conventional antibiotic sensitivity testing (AST) requires scientists to culture microorganisms and then expose them to antibiotics. The culture step means the process can take 24 hours or more, depending on how quickly the bacteria grow. Emerging approaches such as metagenomic sequencing accelerate the process but require specialized and, in some cases, expensive equipment not routinely found in labs. Researchers at Ecole Polytechnique Fédérale de Lausanne (EPFL) in Switzerland discuss their work to develop a method for quickly determining if a pathogen is sensitive to antibiotic using basic equipment.

Researchers have developed a technique in our laboratories that allows us to obtain an antibiogram within two to four hours, instead of the current 24 hours for the most common germs and one month for tuberculosis. The method requires a very basic microfluidic analysis chamber, an optical microscope equipped with a camera or a mobile phone, and dedicated data analysis software. The approach relies on the fact that nanoscale vibrations indicate whether a bacterium is alive. When the bacterium dies, the vibrations stop. Using the equipment, the researchers detected the cessation of vibration upon exposure to antibiotics.

The technique is rapid, extremely simple to set up, possesses single-cell sensitivity, attachments and label free and significantly faster and cheaper than other existing fast AST methods. Importantly, it is independent of the bacterial replication



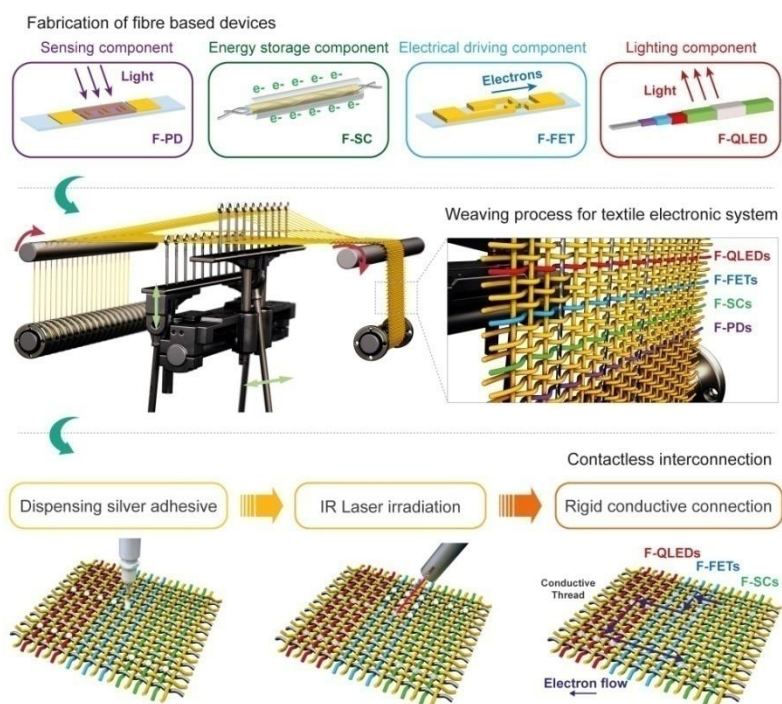
rate, the structure of their cell wall, or motility. Its simplicity opens novel avenues to fast AST, specifically in developing countries.

Image credit and source: <https://www.labpulse.com/diseases/infectious/antibiotic-resistance/article/15383607/fast-cheap-method-for-detecting-antimicrobial-resistance-could-improve>

Cheaper Method for Making Woven Displays and Smart Fabrics of Any Size or Shape

Researchers have developed next generation smart textiles, comprising LEDs, sensors, energy harvesting, and storage that can be produced inexpensively, in any shape or size, using the same machines used to make the clothing we wear every day. Despite recent progress in the development of smart textiles, their functionality, dimensions and shapes have been limited by current manufacturing processes.

the researchers have shown that smart textiles can be made using automated processes, with no limits on their size or shape. Multiple types of fibre devices, including energy storage devices, light-emitting diodes, and transistors were fabricated, encapsulated, and mixed with conventional fibres, either synthetic or natural, to build smart textiles by automated weaving. The fibre devices were interconnected by an automated laser welding method with electrically conductive adhesive. The processes were all optimised to minimise damage to the electronic components, which in turn made the smart textiles durable enough to withstand the stretching of an industrial weaving machine. The encapsulation method was developed to consider the functionality of the fibre devices, and the mechanical force and thermal energy were investigated systematically to achieve automated weaving and laser-based interconnection, respectively.



The research team, working in partnership with textile manufacturers, was able to produce test patches of smart textiles of roughly 50x50 centimeters, although this can be scaled up to larger dimensions and produced in large volumes.

Image credit and source: <https://www.cam.ac.uk/stories/smart-textiles>

New Tool Facilitates Clinical Interpretation of Genetic Information

Researchers develop new method to help interpret mutations in disease genes and improve clinical decision-making. Current predictive models are useful for interpreting mutations, but they are prone to misclassify those that do not cause diseases, contributing to false positives. Researchers from the Max Planck Institute of Molecular Cell Biology and Genetics in Dresden, the Center for Systems Biology Dresden in Germany, and the Harvard Medical School in Boston, USA, have developed a tool called DeMAG. DeMAG provides medical professionals with a tool that allows them to more accurately assess the effect of mutations in those genes by reducing the false positive rate, which means that less benign mutations are predicted as pathogenic.

The researchers developed a statistical model and web server DeMAG that reaches high accuracy in the interpretation of genetic mutations in disease genes. To do this, the researchers carefully selected known pathogenic and benign mutations for training the model. The researchers used clinical and various population databases and selected only mutations whose clinical interpretation is agreed upon among multiple submitters such as medical doctors and genetics laboratories. The researchers also included data from ancestries that are underrepresented in the current population databases, such as Korean or Japanese, to make it even more representative and accurate. DeMAG includes a novel feature, the “partners score”, that identifies clusters of amino acids in a protein that share the same clinical effect. With the partners score, DeMAG takes advantage of the amino acid relationships based on evolutionary information from the genomes of many organisms and the recent AI (Artificial Intelligence) revolution of predicting the 3D shapes of proteins using the AlphaFold algorithm developed by Google DeepMind.

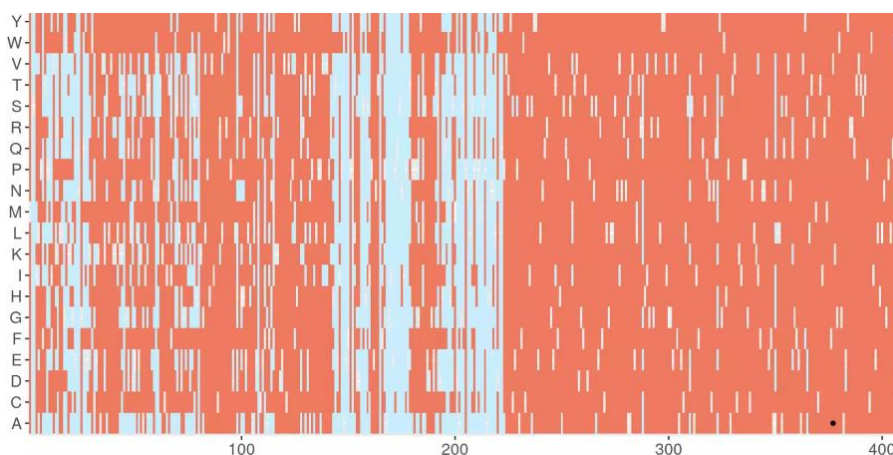


Image credit and source: <https://www.mpg.de/20214308/new-tool-facilitates-clinical-interpretation-of-genetic-information>

Tabletop Vaccine Printer can help More People to get Vaccinated

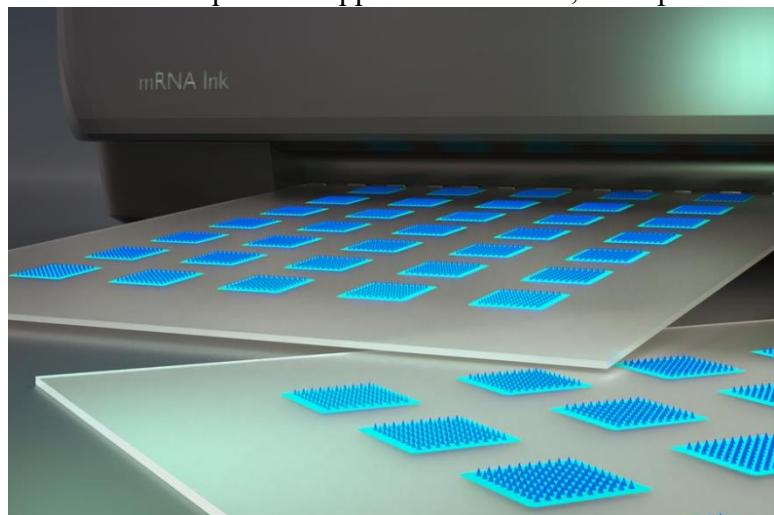
The printer generates vaccine-filled microneedle patches that can be stored long-term at room temperature and applied to the skin. Getting vaccines to people who need them isn't always easy. Many vaccines require cold storage, making it difficult to ship them to remote areas that don't have the necessary infrastructure.

MIT researchers have come up with a possible solution to this problem: a mobile vaccine printer that could be scaled up to produce hundreds of vaccine doses in a day. This kind of printer, which can fit on a tabletop, could be deployed anywhere vaccines are needed.

The printer produces patches with hundreds of microneedles containing vaccine. The patch can be attached to the skin, allowing the vaccine to dissolve without the need for a traditional injection. Once printed, the vaccine patches can be stored for months at room temperature.

Instead of producing traditional injectable vaccines, the researchers decided to work with a novel type of vaccine delivery based on patches about the size of a thumbnail, which contain hundreds of microneedles. Such vaccines are now in development for many diseases, including polio, measles, and rubella. When the patch is applied to the skin, the tips of the needles dissolve under the skin, releasing the vaccine.

The “ink” that the researchers use to print the vaccine-containing microneedles includes RNA vaccine molecules that are encapsulated in lipid nanoparticles, which help them to remain stable for long periods of time.



Inside the printer, a robotic arm injects ink into microneedle molds, and a vacuum chamber below the mold sucks the ink down to the bottom, making sure that ink reaches all the way to the tips of the needles. Once the molds are filled, they take a day or two to dry. The current prototype can produce 100 patches in 48 hours, but the researchers anticipate that future versions could be designed to have higher capacity.

Image credit and source: <https://news.mit.edu/2023/vaccine-printer-could-help-vaccines-reach-more-people-0424>

FORTHCOMING TECH EVENTS

PAKISTAN

- 1st National Symposium on Quantum Information Science And Technology
May 3rd, 2023, National Institute of Lasers and Optronics (NILOP), Islamabad
<http://www.pieas.edu.pk/proclaim-detail.cshtml?ProclaimId=142>
- 1st International Multidisciplinary Conference on Emerging Trends in Engineering Technology
May 9 – 11, 2023, Benazir Bhutto Shaheed University of Technology & Skill Development, Khairpur Mirs, Khairpur
<http://imceet.bbsutsd.edu.pk/>
- 1st International Conference on Modern Technologies in Mechanical & Material Engineering
May 6th, 2023, GIK Institute of Engineering Sciences and Technology, Topi, Swabi
<https://giki.edu.pk/2023/04/16/1st-international-conference-on-modern-technologies-in-mechanical-material-engineering/>
- International Conference on Computing Technologies, Tools and Applications (ICTAPP-23)
May 9 – 11, 2023, The University of Agriculture, Peshawar
<https://ictapp-23.aup.edu.pk/>
- 3rd National Conference on Engineering and Computing Technologies (NCECT)
May 9th, 2023, National University of Modern Languages, Islamabad
<https://www.numl.edu.pk/event/476>
- 3rd International Conference on Pakistan in 21st Century: Challenges, Responses and Opportunities
May 10 – 12, 2023, Fatima Jinnah Women University, Rawalpindi
<https://www.fjwu.edu.pk/fjwu-events/3rd-international-conference-on-pakistan-in-21st-century-challenges-responses-and-opportunities/>
- International Building Energy Efficiency Symposium
May 12 – 13, 2023, NED University of Engineering & Technology, Karachi
[https://www.neduet.edu.pk/sites/default/files/Events/03-04-2023/International%20Building%20Energy%20Efficiency%20Symposium%20\(IBEES\)\(1\).pdf](https://www.neduet.edu.pk/sites/default/files/Events/03-04-2023/International%20Building%20Energy%20Efficiency%20Symposium%20(IBEES)(1).pdf)
- 2nd International Conference on Trends and Research in Chemistry (TRIC-2023)- Hybrid
May 16 – 18, 2023, University of Education, Lahore
<https://tric.ue.edu.pk/>
- International Brain and Biomedicines Conference-2023 (IBBC-2023)
May 18 – 19, 2023, Government College University, Faisalabad
<https://www.tpspak.org/ibbc-2023>
- RCCI 3rd Build Expo 2023
May 19 – 21, 2023, Ayub Park, Rawalpindi
https://docs.google.com/forms/d/1CR6w9Fz0B5PcxCh1SohXwLzb8mIFwzIfrLxm2gII5t0/viewform?fbclid=IwAR2E1nRx5sIhdsRws2NFA6P3HKIOMBojcBMp4NPPQn_1urQKTXdtkevNJO0&edit_request=true&fbzx=-2718037004537506477
- International Workshop on Nanomaterials And Catalysis (IWNMC-23)
July 4th, 2023, PIEAS, Islamabad
<http://www.pieas.edu.pk/proclaim-detail.cshtml?ProclaimId=143>
- 13th National Media Workshop (13th NMW)
July 10 – 15, 2023, National Defense University, Islamabad
<https://www.ndu.edu.pk/temp/issra/NMW/NMW-13.jpg>

INTERNATIONAL

- Space Tech Expo USA Conference
May 2 – 4, 2023, Long Beach, California, USA
<https://www.spacetechexpo.com/conference>

- World Hydrogen 2023 Summit & Exhibition
May 9 – 11, 2023, Rotterdam Ahoy, Netherlands
- <https://www.world-hydrogen-summit.com/>
- 23rd International Conference on Web Engineering in the Age of Artificial Intelligence
June 06 – 09, 2023, Alicante, Spain
<https://icwe2023.webengineering.org/>
- 18th International Conference on Chemistry and the Environment
June 11 – 15, 2023, Venice, Italy
<https://icce2023.com/>
- 11th International Conference on Recent Challenges In Engineering And Technology
June 16 – 17, 2023, Jakarta, Indonesia
<https://icrcet.org/>
- Science And Technology Conference 2023 (Snt2023)
June 19 – 23, 2023, Vienna, Austria
<https://www.ctbto.org/news-and-events/events/snt2023>
- 4th International Conference on Symmetry (Symmetry 2023)
June 21 – 23, 2023, Barcelona, Spain
<https://www.mdpi.com/journal/biology/events/15139>
- International Conference on Advances in Computer Science and Engineering Technology (ACSE2023)
June 24 – 25, 2023, Guangzhou, China
<http://www.icacse.net/>
- Charting Pathways for a Sustainable Asia
June 26 – 28, 2023, Kuala Lumpur, Malaysia
https://www.officialenergyasia.com/?utm_source=google&utm_medium=sem&utm_campaign=align
- 12th Annual Energy Science & Technology Conference 2023
July 05 – 09, 2023, Spokane, Washington
<https://energyscienceconference.com/>
- 16th International Conference on Computer Science and Information Technology
July 6 – 8, 2023, Paris, France
<http://iccsit.org/>
- 45th Annual International Conference of the IEEE Engineering in Medicine and Biology Society
July 24 – 27, 2023, Sydney, Australia
<https://embc.embs.org/2023/program/>
- 38th International Conference on Solution Chemistry
July 9 – 14, 2023, Belgrade, Serbia
<https://iupac.org/event/38icsc/>
- 2nd International Conference on Physics and its Applications
July 17 – 19, 2023, Los Angeles, CA
<https://physics.unitedscientificgroup.org/>
- 9th Annual International Conference on Biology
July 17 – 20, 2023, Athens, Greece
<https://www.atiner.gr/biology>
- 24th International Conference on Engineering Design
July 24 – 28, 2023, Bordeaux, France
<https://iced.designsociety.org/>
- 26th International Conference on Chemical Thermodynamics (ICCT-2023)
July 30th – August 4th, 2023, Osaka, Japan <https://iupac.org/event/icct->

TECH AND TRADE OFFERS

NEXOS Pvt. Ltd.

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In Pakistan, Nexos is recognized because of our premium quality products. Our company never compromises on quality and all the products are produced with state-of-the-art machinery.

Along with its manufacturing line, Nexos also invests a lot of capital and toil in its research and development centre as well. We are committed to establish Nexos as a leader in manufacturing and research hub in Pakistan. All the USB cables are built with supreme quality and the finishing of each product speaks for itself.

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- USB A to Lightning Cable
- USB C to USB C
- USB A to USB C
- USB A to Micro Cable
- HDMI Cables



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