TECHNOLOGY ROUNDUP

A NEWS BULLETIN

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- International Conference on Rehabilitation Science
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- International Conference on Science Engineering & Technology
- 3rd International Conference on Research in Science, Engineering & Technology
- International Congress on History of Science and Technology

PASTIC National Centre
Quaid-i-Azam University Campus
P.O. Box 1217, Islamabad

Phone: 051-9248103-4, 9248128
Fax: 051-9248113
Email: tis.pastic@gmail.com
Web: www.pastic.gov.pk

A SCIENTIST FROM MUET- JAMSHORO, SINDH DEVELOPS NANO-FIBER LAMINATED FACE MASK

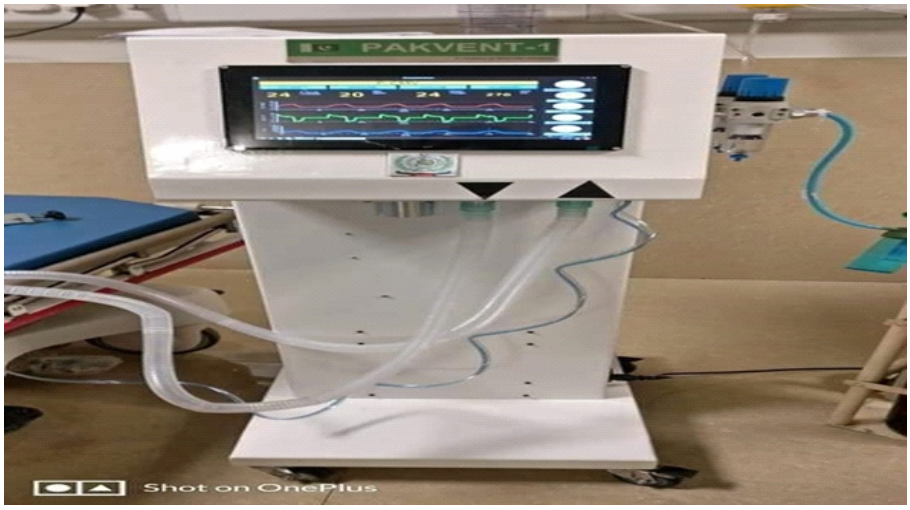
Pakistani Scientists are striving their best to offer plausible preventive measures against the novel corona virus disease 19 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-COV-2). In this context, a remarkable breakthrough has also been achieved by Dr. Zeeshan Khatri, Associate Professor, Mehran University of Engineering and Technology (MUET) Jamshoro, Sindh, who has developed a revolutionary nano-fiber laminated face mask. The mask can effectively be used against COVID-19. The product has a huge market demand. Masks can be provided on discount rates on limited scale at the moment (MUET employees) on trial basis. Patent for this product is pending at the moment.

Source:

Zeeshan Khatri (PhD, Engr.), Textile Engineering Department, Mehran University of Engineering and Technology (MUET) Jamshoro, Pakistan
www.muet.edu.pk/departments/textile/faculty-member

PAKISTANI ENGINEERS DEVELOP INDIGENOUS VENTILATOR (PAKVENT-1) TO COMBAT COVID-19

The COVID-19 crisis has provided an opportunity for Pakistan to manufacture indigenous medical equipments and related products. The development of PAKVENT-1, is one of such initiative which has been jointly undertaken by National Engineering and Scientific Commission (NESCOM), Pakistan Engineering Council (PEC), and Pakistan Ordinance Factories (P.O.F), Wah, Pakistan



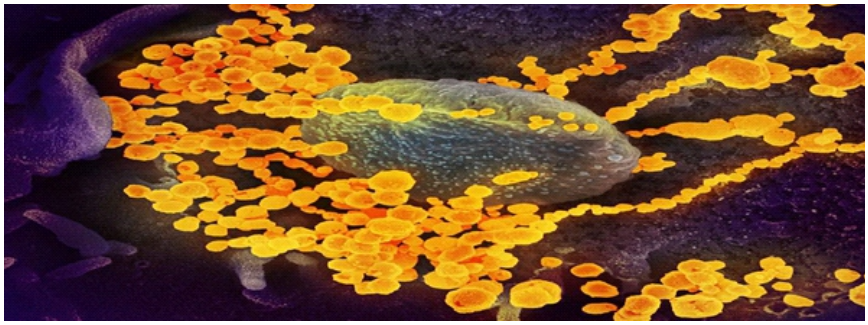
PAKVENT-1 has been indigenously developed to combat COVID-19 in a limited time frame. Trials of Ventilator Prototype PAKVENT-1 have been started. The product specifications are according to the Medicines and Healthcare products Regulatory Agency, UK. The advanced version will be developed after fulfilling the essential requirements

Source:

www.twiter.com/khi_alerts/status/1247529611316957184

ANTIVIRAL REMDESIVIR PREVENTS DISEASE PROGRESSION IN MONKEYS WITH COVID-19

Early treatment with the experimental antiviral drug remdesivir significantly reduced clinical disease and damage to the lungs of rhesus macaques infected with SARS-CoV-2, the coronavirus that causes COVID-19, according to National Institutes of Health scientists.



This scanning electron microscope image shows SARS-CoV-2 (round gold objects) emerging from the surface of cells cultured in the lab. SARS-CoV-2, also known as 2019-nCoV, is the virus that causes COVID-19. The virus shown was isolated from a patient in the U.S.*NIAID-RML*

Courtesy: https://www.nih.gov/news-events/news-releases/antiviral-remdesivir-prevents-disease-progression-monkeys-covid-19

The study was designed to follow dosing and treatment procedures used for hospitalized COVID-19 patients being administered remdesivir in a large, multi-center, clinical trial led by NIH's National Institute of Allergy and Infectious Diseases (NIAID). The scientists posted the work on the preprint server bioRxiv. A study detailing the development of the rhesus macaque model of mild- to-moderate human disease, conducted by the same team of NIAID scientists, was posted to bioRxiv on March 21.

The current study of remdesivir, a drug developed by Gilead Sciences Inc. and NIAID-supported investigators, involved two groups of six rhesus macaques. One group of monkeys received remdesivir and the other animals served as an untreated comparison group. Scientists infected both groups with SARS-CoV-2. Twelve hours later the treatment group received a dose of remdesivir intravenously, and then received a daily intravenous booster dose thereafter for the next six days. The scientists timed the initial treatment to occur shortly before the virus reached its highest level in the animals' lungs.

Twelve hours after the initial treatment, the scientists examined all animals and found the six treated animals in significantly better health than the untreated group, a trend that continued during the seven-day study. They report that one of the six treated animals showed mild breathing difficulty, whereas all six of the untreated animals showed rapid and difficult breathing. The amount of virus found in the lungs was significantly lower in the treatment group compared to the untreated group, and SARS-CoV-2 caused less damage to the lungs in treated animals than in untreated animals.

The investigators note that the data supports initiating remdesivir treatment in COVID-19 patients as early as possible to achieve maximum treatment effect.

Source:

www.sciencedaily.com/2020/04/200417141839.html

A NEW BIOSENSOR FOR THE COVID-19 VIRUS: DETECTION IN THE ENVIRONMENT

Researchers have developed a novel sensor for detecting the new coronavirus. In future, it could be used to measure the concentration of the virus in the environment -- for example, in places where there are many people or in hospital ventilation systems.

Courtesy:https://www.europeanpharmaceuticalreview.com/news/117659/developing-a-covid-19-biosensor-for-faster-diagnostics-and-environmental-monitoring

The optical biosensor combines two different effects to detect the virus safely and reliably: an optical and a thermal one. The sensor is based on tiny structures of gold, so-called gold nanoislands, on a glass substrate. Artificially produced DNA receptors that match specific RNA sequences of the SARS-CoV-2 are grafted onto the nanoislands. The coronavirus is a so-called RNA virus: Its genome does not consist of a DNA double strand as in living organisms, but of a single RNA strand. The receptors on the sensor are therefore the complementary sequences to the virus' unique RNA sequences, which can reliably identify the virus.

The technology the researchers use for detection is called LSPR, short for localized surface plasmon resonance. This is an optical phenomenon that occurs in metallic nanostructures: When excited, they modulate the incident light in a specific wavelength range and create a plasmonic near-field around the nanostructure. When molecules bind to the surface, the local refractive index is changed within the excited plasmonic near-field. An optical sensor located on the back of the sensor can be used to measure this change and thus determine whether the sample contains the RNA strands in question. However, it is important that only those RNA strands that match exactly the DNA receptor on the sensor are captured. This is where a second effect comes into play on the sensor: the plasmonic photothermal (PPT) effect. If the same nanostructure on the sensor is excited with a laser of a certain wavelength, it produces localized heat.

To demonstrate how reliably the new sensor detects the current COVID-19 virus, the researchers tested it with a very closely related virus: SARS-CoV. This is the virus that broke out in 2003 and triggered the SARS pandemic. The two viruses -- SARS-CoV and SARS-CoV2 -- differ only slightly in their RNA. The validation was successful: Tests showed that the sensor can clearly distinguish between the very similar RNA sequences of the two viruses in a matter of minutes. At the moment, however, the sensor is not yet ready to measure the corona virus concentration in the air. A number of developmental steps are still needed to do this -- for example, a system that draws in the air, concentrates the aerosols in it and releases the RNA from the viruses. But once the sensor is ready, the principle could be applied to other viruses and help to detect and stop epidemics at an early stage.

Source:

www.sciencedaily.com/2020/04/200421112520html

PUTTING ARTIFICIAL INTELLIGENCE TO WORK IN THE LAB

Scientists have demonstrated fully-autonomous Scanning Probe Microscopy (SPM) operation, applying artificial intelligence and deep learning to remove the need for constant human supervision. The new system, dubbed DeepSPM, bridges the gap between nanoscience, automation and artificial intelligence (AI), and firmly establishes the use of machine learning for experimental scientific research using SPM.

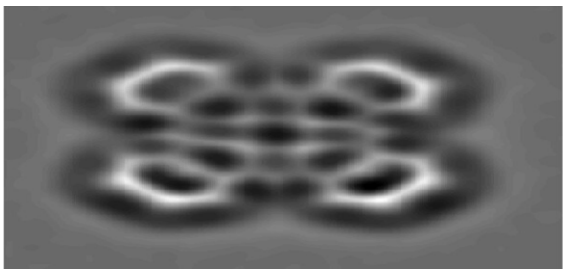


Image acquired by atomic force microscopy (AFM): a single molecule, similar to chlorophyll. Credit: FLEET. https://phys.org/news/2020-03-artificial-intelligence-lab.html

The new system, dubbed DeepSPM, bridges the gap between nanoscience, automation and artificial intelligence (AI), and firmly establishes the use of machine learning for experimental scientific research. Optimising SPM data acquisition can be very tedious. This optimisation process is usually performed by the human experimentalist, and is rarely reported. This new AI-driven system can operate and acquire optimal SPM data autonomously, for multiple straight days, and without any human supervision.
The SPM methodologies will be improved such as atomically-precise nanofabrication and high-throughput data acquisition closer to a fully automated turnkey application. The new deep learning approach can be generalized to other SPM techniques. The researchers have made the entire framework publicly available online as open source, creating an important resource for the nanoscience research community.

The AI-driven system begins with an algorithmic search of the best sample regions and proceeds with autonomous data acquisition. It then uses a convolutional neural network to assess the quality of the data. If the quality of the data is not good, DeepSPM uses a deep reinforcement learning agent to improve the condition of the probe. DeepSPM can run for several days, acquiring and processing data continuously, while managing SPM parameters in response to varying experimental conditions, without any supervision.
The study demonstrates fully autonomous, long-term SPM operation for the first time by combining:

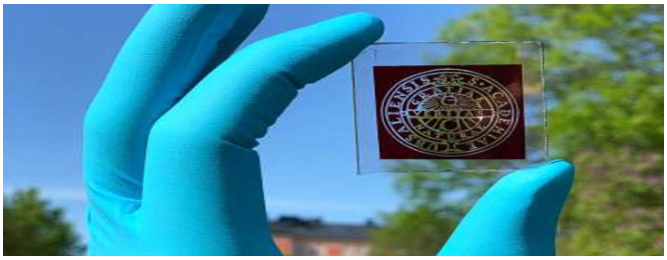
1. an algorithmic approach for sample area selection and SPM data acquisition;
2. supervised machine learning using convolutional neural networks for quality assessment and classification of SPM data, and
3. deep reinforcement learning for dynamic automated in-situ probe management and conditioning.

Source:

www.sciencedaily.com/releases/2020/03/200319090234html

NEW TYPE OF INDOOR SOLAR CELLS FOR SMART CONNECTED DEVICES

In a future where most things in our everyday life are connected through the internet, devices and sensors will need to run without wires or batteries. Researchers present a new type of dye-sensitized solar cells that harvest light from indoor lamps.



credit: Uppsala University. https://phys.org/news/2020-03-indoor-solar-cells-smart-devices.html

The Internet of Things, or IoT, refers to a network of physical devices and applications connected through the internet. It is estimated that by 2025, many facets of our lives will be mediated through 75 billion IoT devices, a majority of which will be located indoors. Broad installation of such IoT devices requires the devices to become autonomous, meaning that they should no longer need batteries or a grid connection to operate. To achieve this, it is crucial to identify a local low-maintenance energy source that can provide local power to IoT devices, especially in ambient conditions.

The researchers from Uppsala University have developed new indoor photovoltaic cells that can convert up to 34 per cent of visible light into electricity to power a wide range of IoT sensors. The team has designed novel dye-sensitized photovoltaic cells based on a copper-complex electrolyte, which makes them ideal for harvesting indoor light from fluorescent lamps and LEDs. The latest promising results establish dye-sensitized solar cells as leaders in power conversion efficiency for ambient lighting conditions, outperforming conventional silicon and solar cells made from exotic materials. The research promises to revolutionize indoor digital sensing for smart greenhouses, offices, shelves, packages and many other smart everyday objects for the Internet of Things."Knowing the spectra of these light sources makes it possible to tune special dyes to absorb indoor light. While generating large amounts of energy, these indoor photovoltaics also maintain a high voltage under low light, which is important to power IoT devices".

The researchers have further designed an adaptive 'power management' system for solar-powered IoT sensors. In contrast to their battery-limited counterparts, the light-driven devices intelligently feed from the amount of light available. Computational workloads are executed according to the level of illumination, minimising energy losses during storage and thus using all light energy to the maximum of its availability. Combining artificial intelligence and automated learning, the solar cell system can thus reduce energy consumption, battery waste and help to improve general living conditions.

In the future, scientists expect that billions of IoT devices self-powered by indoor solar cells will provide everything from environmental information to human-machine and machine-machine communications. Such advanced sensors can further enhance the next wave of robotics and autonomous systems currently in development.Ambient light harvesters provide a new generation of self-powered and smart IoT devices powered by an energy source that is largely untapped. The combination of high efficiency and low cost with non-toxic materials for indoor photovoltaics is of paramount importance to IoT sustainability.

Source:

www.sciencedaily.com/releases/2020/03/200304141441

DIGITAL AGRICULTURE PAVES THE ROAD TO AGRICULTURAL SUSTAINABILITY

Researchers outline how to develop a more sustainable land management system through data collection and stakeholder buy-in.

Bruno Basso, professor of earth and environmental sciences in the College of Natural Science. Credit: Michigan State University. https://phys.org/news/2020-04-digital-agriculture-paves-road-agricultural.html

Digital agriculture is intersecting of agriculture, science, policy and education. Putting that data to use requires an effective balancing of competing economic and social interests while minimizing trade-offs. Technologies like genetic modification and crop production automation help produce more food than we need to survive. And while the modern food system is a monument to human ingenuity and innovation, it is not without problems.

Agriculture's contributions to greenhouse gas emissions, water pollution and biodiversity loss show that major agricultural systems are on a largely unsustainable trajectory. With the growing population, energy demands and pollution would also increase concomitantly. There are too many barriers, too many competing interests and it is necessary to bring people to the table and design a system that works for everyone -- farmers, lawmakers, society and future generations.

To meet this challenge, the researchers proposed a two-step process. The initial step focuses on the design of a sustainable framework -- with goals and objectives -- guided and quantified by digital agriculture technologies. Implementation, the second step, involves increased public-private investment in technologies like digital agriculture, and a focus on applicable, effective policy. The advancements in agronomic sciences to the critical role policymakers must play in implementation and setting the agenda for sustainability in agriculture. Policymakers must make use of digital agriculture to help drive policy through direct contacts with farmers and financial support. The targeted tax incentives and subsidies to support farmers working toward a more sustainable system. If the objective is to increase biodiversity, to reduce nitrogen fertilizer use or to grow less resource-intensive bioenergy perennials, incentivization is key.

Source:

www.sciencedaily.com/releases/2020/04/200422214046

Forthcoming Tech Events

Pakistan

International Conference on Medical, Biological and Pharmaceutical Sciences
28-29 October, 2020
Rawalpindi Pakistan
www.iastem.org/Conference2020/Pakistan/1/ICMBPS/

International Conference on Environment and Natural Sciences
28-29 October, 2020
Rawalpindi Pakistan
www.iastem.org

International Conference on Education and Social Science
28-29 September, 2020
Rawalpindi Pakistan
www.iser.co/conference 2020

International Conference on Rehabilitation Science
27-29 November, 2020
Pearl Continental Hotel Lahore
www.icrsciences.com/

International

International Conference on Computer Systems Engineering and Research
7-8 January, 2021
Tokyo Japan
www.waset.org/computer-system

International Conference on Science Engineering & Technology
28-29 January, 2021
Singapure
www.icest.net

3rd International Conference on Research in Science, Engineering & Technology
11-13 March, 2021
Oxford UK
www.icrset.org

International Congress on History of Sceience and Technology
25-31 July, 2021
Czech Republic Prague
www.ichst2021.org

Tech & Trade Offers

PCSIR HAND SANITIZER & SURFACE DISINFACTANT

PCSIR OFFERS SALE OF HAND SANITIZER & SURFACE DISINFECTANT FOR PUBLIC AND ORGANIZATIONS

Pakistan Council of Scientific and Industrial Research (PCSIR) Lahore under Ministry of Science and Technology, Government of Pakistan, has started sale of Hand Sanitizer & Surface Disinfectant for public Organizations.

Hand Sanitizer price is 60 ml @ Rs 100, 100 ml @ Rs 170/-, 200 ml @ Rs 320/-, 500 ml @ Rs 700/-, 1L @ 1300 5L @ Rs 5000. Surface Disinfectant price is 5 L (3X) @ Rs 500, 10 L (3X) @ Rs 700, 5 L (10X) @ Rs 1900, 10 L (10X) @ Rs 3750 16 L (10X) @ Rs 6000

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Contact us:

PCSIR Labs Complex, Lahore.
Email:llcpcsir@gmail.com

About PASTIC

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