

TECHNOLOGY ROUNDUP

A NEWS BULLETIN FROM
Technology Information Section (TIS)
Pakistan Scientific & Technological Information Centre



PASTIC

Vol.9 No.2

March-April, 2017

Editorial Board

Patron/Executive Editor
Prof. Dr. Muhammad Akram Shaikh
Director General, PASTIC

Managing Editors
Ms. Nageen Ainuddin
Mr. M. Aqil Khan
Editor
Syed Aftab Hussain Shah

Composer
Kashif Farooqui

Tech News Headlines

- Remote Controlling and Monitoring of Microscopic Slides
- LED Based Optical Wireless Communication System for WBAN
- Cell phone System Makes DNA Detection Affordable and Portable
- Chemists Are First in Line for Quantum Computing's Benefits
- Magnetic Brain Stimulation causes Weight loss by making Gut Bacteria Healthier
- No Need for Roads Flying Car Soars over Water
- New Technology could deliver Drugs to Brain Injuries
- Lithium-ion Battery inventor introduces New Technology for Fast-charging, noncombustible Batteries

Tech & Trade Offers

ENGINEERING CONTROL SYSTEMS



Forthcoming Tech Events

- International Conference on Civil and Environmental Engineering
- International Conference on Science, Technology, Engineering & Management
- International Multi-Disciplinary Research Conference
- International Conference on Agricultural and Food Science
- International Conference on Materials Science and Nano Materials
- International Energy Program Evaluation Conference
- International Conference on Communication and Network Technology
- International Conference on Management, Engineering, Science & Technology

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

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

Indigenous Technology

Remote Controlling and Monitoring of Microscopic Slides

Remotely controlled microscopic slide was designed using especial Graphical User Interface (GUI) which interfaces the user at remote location with the real microscope using site and the user can easily view and control the slide present on the microscope's stage. Precise motors have been used to allow the movement in all the three dimensions required by a pathologist. The pathologist can easily access these slides from any remote location and so the physical presence of the pathologist is now made easy.

This invention would increase the health care efficiency by reducing the time and cost of diagnosis, making it very easy to get the expert's opinion and supporting the pathologist to relocate himself for his work. The microscope is controlled with computer with an attractive Graphical User Interface (GUI), through which a pathologist can easily monitor, control and record the image of a slide. The pathologist can now do his work regardless of his location, time, cost and physically presence of lab equipment. The technology will help the specialist in viewing the patients slide from any location in the world. He would be able to monitor and control the stage. This will also help the pathological laboratories in getting opinion from senior pathologist who are present at any far location in the world. This system also reduces the life risks of the patients.

Source:

Ghulam Mustafa, Muhammad Tahir Qadri and Umar Daraz. PCSIR Laboratories Complex, Karachi- & Department of Electronics Engineering, Sir Syed University of Engineering & Technology, Karachi, Pakistan
Pakistan Journal of Scientific & Industrial Research Series A: Physical Sciences 2016 59 (1) 30-33

Indigenous Technology

LED Based Optical Wireless Communication System for WBAN

In this article the O-WBANs (Optical Wireless Body Area Networks) is presented as an alternative to the radio and microwave BANs which are plagued with issues like interference, power hungry, hazardous and costly spectrum. Various experiments performed in this work demonstrate the feasibility of LED (Light-Emitting Diode) based optical systems to be used for BANs. The system cost is kept as low as possible. Mainly the effects on the optical link are observed under ambient light and with different modulation schemes by varying link distance and line of sight in this paper. Experimental results reveal the satisfactory link availability up to the distance of 7 feet (around 2m, the optimum range of WBAN) and within the field of view of 30-60°. The low cost solution presented in this paper meets the WBANs data rate requirement for physiological data (i.e. 10-100 kbps). As IR (Infra-Red) signals do not provide any interference with the signals generated by the medical equipment of hospitals which is the problem in case of RF or microwave signals, additionally the IR signals are confined within a room hence IR signaling can prove to be potential candidate for WBAN fulfilling its security and limited access requirement.

Source:

Attiya Baqai, Fahim Aziz Umrani, and Bhawani Shankar Chowdhry. Institute of Information & Communication Technologies, Mehran University of Engineering & Technology, Jamshoro Mehran University Journal of Engineering & Technology, 2016 Volume 35, No. 4, 667-672.

Cellphone System Makes DNA Detection Affordable and Portable

The combined dye/cellphone reader system achieved comparable results to equipment costing tens of thousands of dollars more. (Credit: Dino Di Carlo/UCLA) In a proof-of-concept study, researchers from the University of California Los Angeles showed that they could detect the presence of DNA molecules using a new dye mixture and the sensors and optics of cellphones. The new system reads light created by the detector dye mixture, with a 10-times brighter signal, at a fraction of the cost of traditional laboratory equipment. Typical diagnostic tests, such as ones for infectious diseases and genetic disorders, rely on amplifying the number of disease related nucleic acids like DNA or RNA with fluorescent dyes. However, intercalator dyes, as they are called, which are small changes in light emitted from molecules that associate with DNA, are too subtle and unstable for regular cellphone camera sensors. To address the problem, researchers including Aydogan Ozcan, Chancellor's Professor of Electrical Engineering and Bioengineering, and Dino Di Carlo, professor of bioengineering and mechanical and aerospace engineering, found that by including a chemical additive they could stabilize the intercalator dyes and significantly increase the fluorescent signal above the background light level. This made it possible to incorporate the test with inexpensive cellphone based detection methods.



The new system was used in a process called loop-mediated isothermal amplification (LAMP), with DNA from lambda phage as the target molecule, and achieved results that were comparable to traditional laboratory equipment that costs tens of thousands of dollars more. The team also developed a handheld reader to enable a cellphone to pick up on the light produced from dyes associated with amplified DNA while they were in well plates.

The reader uses a cost-effective and portable fiber optic bundle that routed each well in the plate's signal to a unique site of the camera sensor. This too produced results comparable to a standard benchtop reader, but at a significantly lower cost. The researchers believe this reader could have applications for use with other fluorescence-based diagnostic tests and could be especially valuable in resource-limited settings.

“Currently nucleic acid amplification tests have issues generating a stable and high signal, which often necessitates the use of calibration dyes and samples which can be limiting for point-of-care use,” Di Carlo said in a prepared statement. “The unique dye combination overcomes these issues and is able to generate a thermally stable signal, with a much higher signal to noise ratio. The DNA amplification curves we see look beautiful without any of the normalization and calibration which is usually performed, to get to the point that we start at.” The team, including lead author Janay Kong, a Ph.D. student in bioengineering, suggest that the novel dye combinations could be used in a number of other amplification tests because it can be universally used to detect any nucleic acid amplification. Up next they plan to test the system on complex clinical samples and nucleic acids linked with pathogens like influenza.

www.biosciencetechnology.com

Chemists Are First in Line for Quantum Computing's Benefits

Both IBM and Google said they aim to commercialize quantum computers within the next few years (Google specified five), selling access to the exotic machines in a new kind of cloud service. The competitors predict a new era in which computers are immensely more powerful, with dividends including more efficient routing for logistics and mapping companies, new forms of machine learning, better product recommendations, and improved diagnostic tests. But before any of that, the first quantum computer to start paying its way with useful work in the real world looks likely to do so by helping chemists trying to do things like improve batteries or electronics. So far, simulating molecules and reactions is the use case for early, small quantum computers sketched out in most detail by researchers developing the new kind of algorithms needed for such machines.



Quantum computers, which represent data using quantum-mechanical effects apparent at tiny scales, should be able to perform computations impossible for any conventional computer. Recent advances on hardware that might be used to build them has led to a flurry of investment from companies including Microsoft, Intel, Google, and IBM

www.technologyreview.com

Magnetic Brain Stimulation causes Weight loss by making Gut Bacteria Healthier

A new study finds that a noninvasive electromagnetic brain stimulation technique helps obese people lose weight, partly by changing the composition of their intestinal bacteria -- the so-called gut microbiota. This study expands on the researchers' previous finding that deep transcranial magnetic stimulation (dTMS) reduced food cravings and induced weight loss in obese individuals. Unlike deep brain stimulation, DTMS does not need an operation or implantation of electrodes. Instead, an electromagnetic coil is placed on the scalp and sends magnetic pulses to stimulate specific deep regions of the brain. Currently approved in the U.S. for treating major depression, dTMS is being studied in some countries for the treatment of other neuropsychiatric disorders, especially addiction.

An underlying cause of obesity may be an impaired gut microbiota composition, an imbalance in the complex mix of beneficial and harmful microorganisms that inhabit the digestive tract. Principal investigator Livio Luzi, M.D Professor and Head of endocrinology at the I.R.C.C.S Policlinico San Donato and the University of Milan Mil Italy said scientists now know that an impaired gut microbiota can alter the brain's signals for appetite and satiety, or fullness. He and his co-workers studied



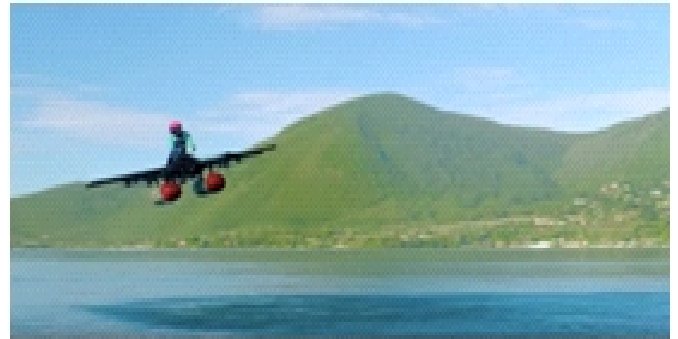
whether DTMS could improve the gut microbiota composition in obese persons and, if so, by what underlying mechanisms. After five weeks of treatment, subjects receiving DTMS lost more than 3 percent of their body weight and more than 4 percent of their fat -- significantly more than controls did, Luzi reported.

Results of the fecal analysis demonstrated that, after five weeks, DTMS-treated subjects had greatly increased quantities of several beneficial bacterial species with anti-inflammatory properties, such as are found in healthy people. The control group, however, had no clinically relevant alterations in their microbiota composition, Luzi said. He also reported that changes in the abundance of other bacterial species correlated with improvement of metabolic and hormonal parameters, including glucose, insulin, several pituitary hormones and norepinephrine. "These changes suggest a beneficial effect of dTMS on both weight loss and change in microbiota composition," Luzi said. "Our research shows the innovative ability of DTMS in exerting anti-obesity effects through alteration of the gut-brain axis."

www.sciencedaily.com

No Need for Roads: Flying Car Soars over Water

A Silicon Valley company Kitty Hawk, has designed a flying car that requires no pilot's license to operate and is designed to be flown over water. A newly released video shows a prototype of a flying car, which resembles an airborne motorcycle, zooming over open water. The prototype can take off vertically, runs solely on electric power and could fit in the average person's garage, said Kitty Hawk, the company that built the prototype flying machine. The company was funded by Google co-founder Larry Page. The working prototype took to the skies earlier this month, but customers won't be able to get their own until the end of this year, Kitty Hawk said. The flying car is currently regulated as an ultralight aircraft under Part 103 of the Federal Aviation Administration's regulations for these types of vehicles, according to Kitty Hawk.



The flying car isn't designed to replace your Toyota Camry on the morning commute, the company said. Rather, the car is intended to fly over a body of freshwater, and is suited for flight only in uncongested areas, the company said. However, the barrier to entry for the car is low, because people aren't required to have a pilot's license to operate the vehicle, Kitty Hawk said. As a result, the new flying car is more akin to a hobbyist's jet ski than a truly new mode of transportation, the company said.

www.livescience.com

New Technology could deliver Drugs to Brain Injuries

A new study led by scientists at the Sanford Burnham Prebys Medical Discovery Institute (SBP) describes a technology that could lead to new therapeutics for traumatic brain injuries. The discovery, published in Nature Communications, provides a means of homing drugs or nanoparticles to injured areas of the brain. "We have

found a peptide sequence of four amino acids, cysteine, alanine, glutamine, and lysine (CAQK), that recognizes injured brain tissue," said Erkki Ruoslahti, M.D., Ph.D., distinguished professor in SBP's NCI-Designated Cancer Center and senior author of the study. "This peptide could be used to deliver treatments that limit the extent of damage." About 2.5 million people in the US sustain traumatic brain injuries each year, usually resulting from car crashes, falls, and violence. While the initial injury cannot be repaired, the damaging effects of breaking open brain cells and blood vessels that ensue over the following hours and days can be minimized.

"Current interventions for acute brain injury are aimed at stabilizing the patient by reducing intracranial pressure and maintaining blood flow, but there are no approved drugs to stop the cascade of events that cause secondary injury," said Aman Mann, Ph.D., postdoctoral researcher in Ruoslahti's lab and the study's co-first author, together with Pablo Scodeller, Ph.D. More than one hundred compounds are currently in preclinical tests to lessen brain damage following injury. These candidate drugs block the events that cause secondary damage, including inflammation, high levels of free radicals, over-excitation of neurons, and signaling that leads to cell death. "Our goal was to find an alternative to directly injecting therapeutics into the brain, which is invasive and can add complications," explained Ruoslahti. "Using this peptide to deliver drugs means they could be administered intravenously, but still reach the site of injury in sufficient quantities to have an effect." The CAQK peptide binds to components of the meshwork surrounding brain cells called chondroitin sulfate proteoglycans. Amounts of these large, sugar-decorated proteins increase following brain injury.



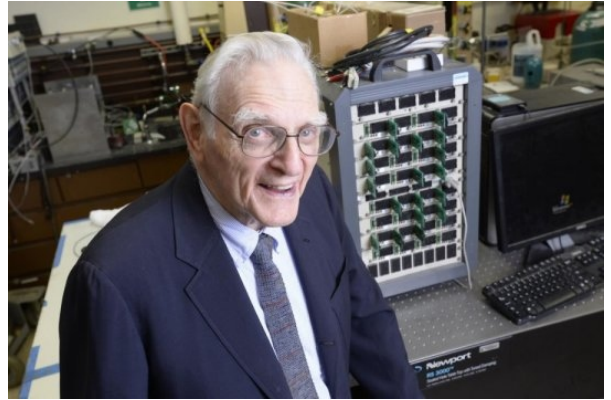
"Not only did we show that CAQK carries drug-sized molecules and nanoparticles to damaged areas in mouse models of acute brain injury, we also tested peptide binding to injured human brain samples and found the same selectivity," added Mann. "This peptide could also be used to create tools to identify brain injuries, particularly mild ones, by attaching the peptide to materials that can be detected by medical imaging devices," Ruoslahti commented. "And, because the peptide can deliver nanoparticles that can be loaded with large molecules, it could enable enzyme or gene-silencing therapies." This platform technology has been licensed by a startup company, AivoCode, which was recently awarded a Small Business Innovation Research (SBIR) grant from the National Science Foundation for further development and commercialization. Ruoslahti's team and their collaborators are currently testing the applications of these findings using animal models of other central nervous system (CNS) injuries such as spinal cord injury and multiple sclerosis.

www.sciencedaily.com

Lithium-ion Battery inventor introduces New Technology for fast-charging, noncombustible Batteries

A team of Researchers School of Engineering at The University of Texas at Austin and co-inventor of the lithium-ion battery, has developed the first all-solid-state battery cells that could lead to safer, faster-charging, longer-lasting rechargeable batteries for handheld mobile devices, electric cars and stationary energy storage. Goodenough's latest breakthrough, completed with Cockrell School senior research fellow Maria Helena Braga, is a low-cost all-solid-state battery that is noncombustible and has a long cycle life (battery life) with a high volumetric energy density and fast rates of charge and discharge. The engineers describe their new technology in a recent paper published in the journal Energy & Environmental Science. "Cost, safety, energy density, rates of charge and discharge and cycle life are critical for battery-driven cars to be more widely

adopted. We believe our discovery solves many of the problems that are inherent in today's batteries," Goodenough said. The researchers demonstrated that their new battery cells have at least three times as much energy density as today's lithium-ion batteries. A battery cell's energy density gives an electric vehicle its driving range, so a higher energy density means that a car can drive more miles between charges. The UT Austin battery formulation also allows for a greater number of charging and discharging cycles, which equates to longer-lasting batteries, as well as a faster rate of recharge (minutes rather than hours).



Today's lithium-ion batteries use liquid electrolytes to transport the lithium ions between the anode (the negative side of the battery) and the cathode (the positive side of the battery). If a battery cell is charged too quickly, it can cause dendrites or "metal whiskers" to form and cross through the liquid electrolytes, causing a short circuit that can lead to explosions and fires. Instead of liquid electrolytes, the researchers rely on glass electrolytes that enable the use of an alkali-metal anode without the formation of dendrites. The use of an alkali-metal anode (lithium, sodium or potassium) -- which isn't possible with conventional batteries -- increases the energy density of a cathode and delivers a long cycle life. In experiments, the researchers' cells have demonstrated more than 1,200 cycles with low cell resistance. Additionally, because the solid-glass electrolytes can operate, or have high conductivity, at -20 degrees Celsius, this type of battery in a car could perform well in subzero degree weather. This is the first all-solid-state battery cell that can operate under 60 degree Celsius. Braga began developing solid-glass electrolytes with colleagues while she was at the University of Porto in Portugal. About two years ago, she began collaborating with Goodenough and researcher Andrew J. Murchison at UT Austin. Braga said that Goodenough brought an understanding of the composition and properties of the solid-glass electrolytes that resulted in a new version of the electrolytes that is now patented through the UT Austin Office of Technology Commercialization.

The engineers' glass electrolytes allow them to plate and strip alkali metals on both the cathode and the anode side without dendrites, which simplifies battery cell fabrication. Another advantage is that the battery cells can be made from earth-friendly materials. "The glass electrolytes allow for the substitution of low-cost sodium for lithium. Sodium is extracted from seawater that is widely available," Braga said. Goodenough and Braga are continuing to advance their battery-related research and are working on several patents. In the short term, they hope to work with battery makers to develop and test their new materials in electric vehicles and energy storage devices.

www.sciencedaily.com

Forthcoming Tech Events

National

International Conference on Civil and Environmental Engineering

29-30, August 2017
Rawalpindi, Pakistan

International Conference on Science, Technology, Engineering & Management

29-30 September 2017
Rawalpindi,
[www. Conference2017/Pakistan/2/ICSTEM/](http://www.Conference2017/Pakistan/2/ICSTEM/)

International Multi-Disciplinary Research Conference

7th October 2017
Mandi Bahauddin
www.imdrc.com.pk

International Conference on Agricultural and Food Science

25-27, October 2017
Lahore, Pakistan
www.icbb.vu.edu.pk

International Events

International Conference on Materials Science and & Nano Materials

July 14 -16, 2017
Barcelona Spain
www.icmsn.org/

International Energy Program Evaluation Conference

August 8 -10, 2017
Baltimore, Maryland
www.iepec.org

International Conference on Communication and Network Technology

1-3 September, 2017
Zurich, Switzerland
www.iccnt.org

International Conference on Management, Engineering, Science & Technology

1-2 October 2017
United Arab Emirates
www.icmest.net/

Tech & Trade Offers

Engineering Control Systems



DEALS IN:-

- ✎ **Medium Voltage Panels**
- ✎ **Low Voltage Panels**
- ✎ **PFI Plants**
- ✎ **Distribution Board**
- ✎ **AMF/ATS Panels**
- ✎ **Bus Tie Ducts**
- ✎ **Industrial Control Panels**
- ✎ **HVAC Panels**
- ✎ **CNG Control Panels**
- ✎ **PLC Control Panels**
- ✎ **Boiler Control Panels**
- ✎ **Cable Trays**
- ✎ **Cable Ladders**

Company Contact:-

4-Country Club Road Opposite Jinah Hospital

Lahore-54590

Phone: +92 (42) 35163850, 35201350

Fax: +92 (42) 35162391

About PASTIC

PASTIC serves as a gateway for Scientific & Technological Information for R&D by catering to the information needs of researchers, entrepreneurs, industrialists, educationists, policy makers and planners through anticipatory and responsive information services.

Technology Information Section works exclusively for support and promotion of technological information on trade and industry in the country. "Technology Roundup" is a news bulletin that provides latest and innovative technology news, forthcoming events, etc. It also promotes products, technologies and services globally in sectors such as Agro-Industry, Bio-Technology, Building Material, Business, Chemicals, Electronics, Energy, Fisheries, Food Processing, Machinery, Packaging, Mining Pharmaceuticals and Textiles.

Please give us your feedback and address queries to shah_aftab@yahoo.com