

TECHNOLOGY ROUNDUP

A NEWS BULLETIN

Technology Information Services Section (TIS)
Pakistan Scientific & Technological Information Centre



PASTIC

Vol.11 No 2

March-April, 2019

Editorial Board

Executive Editor

Prof. Dr. Muhammad Akram Shaikh
Director General, PASTIC

Managing Editors

Ms. Nageen Ainuddin
Dr. Saima Huma Tanveer
Editor
Dr. Syed Aftab Hussain Shah

Composer

Kashif Farooqui

Tech News Headlines

- LTE and GPS based Deca Band Printed Antenna for Cellular Mobile Handset Communication Applications
- A Robust Color Image Watermarking Scheme using Chaos for Copyright Protection
- Imaging Method Reveals long-lived Patterns in Cells of the Eye
- Fisheries Science and Management in the Face of Climate Change
- Could Computer Games Help Farmers Adapt to Climate Change?
- High-powered Fuel Cell Boosts Electric-Powered Submersibles, Drones
- Scientists print first 3D heart using patient's biological materials: Engineered heart completely matches the immunological, cellular, biochemical and anatomical properties of the patient
- Deciphering the Walnut Genome

Tech & Trade Offers

General Foundry Engineering Works



Forthcoming Tech Events

- International Conference on Mechanical And Automobile Engineering
- International Academic Conference on Engineering Technology & Innovations
- 1st International Conference on Language, Literature and Culture
- International Conference on Innovative Engineering Technologies
- International Conference on Engineering & Technology
- Wind Energy Science Conference 2019
- International Conference of Electrical and Electronics Engineering
- International Conference on Recent Innovations in Engineering 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

LTE and GPS based Deca Band Printed Antenna for Cellular Mobile Handset Communication Applications

A novel mobile phone antenna has been developed for radiations simultaneously in ten frequency bands for applications of LTE (Long-Term Evolution), GPS (Global Positioning System), GSM (Global System for Mobile Communications), PCS (Public and Commercial Services), DCS (Distributed Control System), UMTS (Universal Mobile Telecommunications System) and WiMAX (Worldwide Interoperability for Microwave Access).

The antenna demonstrates novel characteristics for resolving the challenge of simultaneous radiation capabilities for the GSM and GPS applications with frequencies of 850/900 and 1575 MHz respectively, along with resonances at frequency band of 700 MHz for LTE applications, 1800 and 1900 MHz for PCS and DCS applications, 2100 MHz for UMTS applications, 2400 and 2500 MHz for LTE applications and 3300 MHz for WiMAX applications with $S_{11} = -6$ dB matching criteria (VSWR 3:1). The antenna architecture comprises top and bottom copper layers embedded with monopole radiating element, branch line, slots and various stub lines. The desired operating bands are achieved in a compact area with overall dimensions of 0.8x60x120 mm for the height, width and length respectively of the antenna providing suitable platform for mobile handset applications. Omni-directional radiation pattern characteristics are achieved throughout the range of frequencies by designing the proposed antenna in monopole configuration.

Proposed antenna is fabricated and results for the surface currents, s-parameters and 3D (Three-Dimensional) gain plots are illustrated for the proof of concept.

Source:

MOHANI, Syed Sheraz -ul- Hasan ; RAZA, Kamran . LTE and GPS based Deca Band Printed Antenna for Cellular Mobile Handset Communication Applications. Mehran University Research Journal of Engineering and Technology, 2019 38(2) 313-320

A Robust Color Image Watermarking Scheme using Chaos for Copyright Protection

A novel spatial domain symmetric color image robust watermarking scheme based on chaos is presented in this research. An exponential growth in multimedia applications has led to fast adoption of digital watermarking phenomena to protect the copyright information and authentication of digital contents. The watermark is generated using chaotic logistic map and optimized to improve inherent properties and to achieve robustness. The embedding is performed at 3 LSBs (Least Significant Bits) of all the three color components of the host image. The sensitivity of the chaotic watermark along with redundant embedding approach makes the entire watermarking scheme highly robust, secure and imperceptible.

In this paper, various image quality analysis metrics such as homogeneity, contrast, entropy, PSNR (Peak Signal to Noise Ratio), UIQI (Universal Image Quality Index) and SSIM (Structural Similarity Index Measures) are measured to analyze proposed scheme. The proposed technique shows superior results against UIQI. Further, the watermark image with proposed scheme is tested against various image-processing attacks.

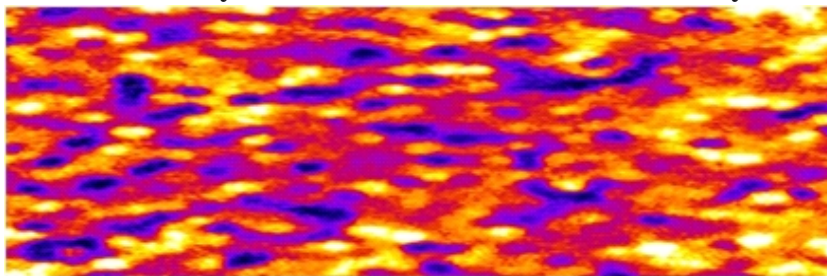
The robustness of watermarked image against attacks such as cropping, filtering, adding random noises and JPEG compression, rotation, blurring, darken etc. is analyzed. The proposed scheme is symmetric; therefore, reversible process at extraction requires successful extraction of embedded watermark.

Source:

ASIF KHAN, Muhammad et al. A Robust Color Image Watermarking Scheme using Chaos for Copyright Protection. Mehran University Research Journal of Engineering and Technology, 2019 Volume 38(2), 361-378

Imaging Method Reveals long-lived Patterns in Cells of the Eye

Technique could aid early detection and treatment of certain eye diseases.



Mosaic of retinal pigment epithelial cells. Johnny Tam, Ph.D., NEI

Cells of the retinal pigment epithelium (RPE) form unique patterns that can be used to track changes in this important layer of tissue in the back of the eye, researchers at the National Eye Institute (NEI) have found. Using a combination of adaptive optics imaging and a fluorescent dye, the researchers used the RPE patterns to track individual cells in healthy volunteers and people with retinal disease. The new finding could provide a way to study the progression and treatment of blinding diseases that affect the RPE.

This study is proof-of-concept that we can use a fluorescent dye to reveal this unique fingerprint of the RPE, and to monitor the tissue over time. The RPE is a cell layer that lies next to and maintains the health of the retina's light-sensing photoreceptors. Because the cells contain pigment, and thus absorb incoming light, the thin layer of RPE tissue is difficult to image. Even using adaptive optics, a specialized imaging technology that can distinguish individual cells in the eye visualizing the RPE layer was found challenging.

This is to note that while the dye fades from the blood vessels quickly, within about thirty minutes, the dye persists in the RPE for several hours, revealing a fluorescent mosaic pattern, with some cells appearing more brightly and others more dimly. Software was designed to recognize RPE patterns and then computing changes that occur from one imaging session to the next. For healthy volunteers, there was very little change in the RPE over several months, with the vast majority of the cells retaining a stable amount of ICG staining.

This study uses adaptive optics imaging, it would be possible in future to image this RPE mosaic pattern with conventional imaging methods. Being able to visualize this pattern over time will help researchers better understand how the RPE layer changes over time, and eventually help guide the development of new treatments to prevent damage to or repair the RPE.

Source:

www.nih.gov/news-events/news-releases/imaging-method-reveals-long-lived-patterns-cells-eye

Fisheries Science and Management in the Face of Climate Change

A new report from National Oceanic and Atmospheric Administration (NOAA, an American scientific agency) identifies fisheries challenges and recommendations to better detect, understand, assess, and manage shifting distributions and changing productivity of marine species with changing climate and ocean conditions.



Climate-ready fisheries management process.

Shifts in species distributions and changes in productivity present challenges for fisheries management. As ocean temperatures warm, species move to remain within their preferred temperature ranges. These shifts may cross fishery management boundaries and impact where fishermen have to go to find their catch. Additionally, changes in climate, ocean, and ecosystem conditions can impact species' vital rates. This could lead to changes in stock productivity and the amount of fish available to be caught.

To help address the numerous challenges facing fisheries management under changing climate and ocean conditions, NOAA Fisheries is working to increase the production, delivery, and use of climate and environmental information to fulfill the agency's living marine resource stewardship mandates as called for in the National Climate Science Strategy, Ecosystem-Based Fisheries Management Road map, and Implementing a Next Generation Stock Assessment Enterprise.

The new development by a team of scientists from across the United States identifies recommendations to strengthen six key steps in the science-to-management process. If enacted at appropriate regional and national levels, these recommendations would help better prepare for, and respond to, shifting distributions and changing productivity of marine fish stocks. These initiatives can be equally fruitful for the fisheries sector of Pakistan.

1. Detect and anticipate changes.
2. Understand key drivers of changes.
3. Evaluate priorities and risks.
4. Conduct assessments and develop forecasts.
5. Communicate scientific advice to management.
6. Manage fisheries under changing conditions.

Source:

www.fisheries.noaa.gov/feature-story/fisheries-science-and-management-face-climate-change?utm_medium=email&utm_source=govdelivery

Could Computer Games Help Farmers Adapt to Climate Change?

Researchers from Sweden and Finland have developed the interactive web-based Maladaptation Game, which can be used to better understand how Nordic farmers make decisions regarding environmental changes and how they negotiate the negative impacts of potentially damaging decisions. Web-based gaming, such as simulation games, can promote innovative communication strategies that engage farmers with scientific research and help them adapt to climate change.

Methods employed to tackle climate change, such as, for example, improving drainage systems to cope with increased levels of precipitation, are known as adaptation strategies. "Maladaptation" is the implementation of poor decisions or methods that were initially considered beneficial, but which could actually increase people's vulnerability in the future. Tested on stakeholders from the agricultural sector in Sweden and Finland, the Maladaptation Game presents the player with four agricultural challenges: precipitation, temperature increase/drought, longer growing seasons and increased risk of pests and weeds. For each challenge, the player must make a strategic decision based on the options given. At the end, the player receives a summary of the potential negative outcomes based on their decisions.

"While we observed that the conceptual thinking of the game sometimes clashes with the players' everyday experiences and practice, we believe gaming may function as an eye-opener to new ways of thinking. Serious games should be designed to include elements of thinking and sharing, which will stimulate reflection and discussion among stakeholders.

Source:

www.sciencedaily.com/releases/2019/04/190418101614.html

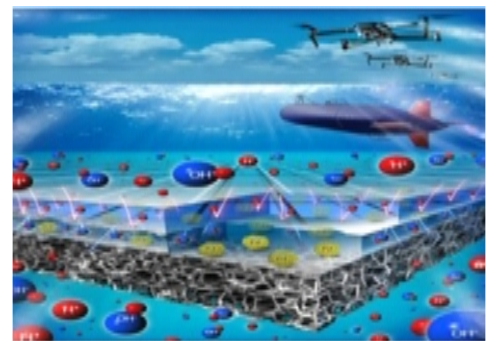
High-powered Fuel Cell Boosts Electric-Powered Submersibles, Drones

A high-powered fuel cell has been developed that operates at double the voltage of today's commercial fuel cells. It could power underwater vehicles, drones and eventually electric aircraft at a significantly lower cost.

This is an artistic representation of the pH-gradient enabled microscale bipolar interface (PMBI) created by Vijay Ramani and his lab. The two layers that make up the interface are covering the third bottom layer, which is the electrode with palladium particles on it. The submarine and drones are envisioned applications of the direct borohydride fuel cell which incorporates the PMBI. Credit: McKelvey School of Engineering

This advancement using a unique pH-gradient-enabled microscale bipolar interface (PMBI), could power a variety of transportation modes -- including unmanned underwater vehicles, drones and eventually electric aircraft -- at significantly lower cost.

This technology allows us to run this fuel cell with liquid reactants and products in submersibles, in which neutral buoyancy is critical. This technology also allows us applying it in higher-power applications such as drone flight. The fuel cell developed at Washington University uses an acidic electrolyte at one electrode and an alkaline electrolyte at the other electrode. Typically, the acid and alkali will quickly react when brought in contact with each other.



The key breakthrough is the PMBI, which is thinner than a strand of human hair. Using membrane technology developed at the McKelvey Engineering School, the PMBI can keep the acid and alkali from mixing, forming a sharp pH gradient and enabling the successful operation of this system.

After development of PMBI, fuel cell device was optimized and the best operating conditions were identified to achieve a high-performance fuel cell. It has been a tremendously challenging and rewarding pathway to developing the new ion-exchange membranes that has enabled the PMBI."

Source:

www.sciencedaily.com/releases/2019/02/190225123459.html

Scientists Print first 3D Heart using patient's Biological Materials: Engineered Heart completely matches the Immunological, Cellular, Biochemical and Anatomical Properties of the Patient

In a major medical breakthrough, researchers have 'printed' the world's first 3D vascularised engineered heart using a patient's own cells and biological materials.



A 3D-printed, small-scaled human heart engineered from the patient's own materials and cells. Credit: Advanced Science. © 2019 The Authors.

Until now, scientists in regenerative medicine -- a field positioned at the crossroads of biology and technology - have been successful in printing only simple tissues without blood vessels. This is the first time anyone anywhere has successfully engineered and printed an entire heart replete with cells, blood vessels, ventricles and chambers.

This heart is made from human cells and patient-specific biological materials. In this process these materials serve as the bioinks, substances made of sugars and proteins that can be used for 3D printing of complex tissue models. The results demonstrate the potential of adopting approach for engineering personalized tissue and organ replacement in the future. The size of this 3D heart is small but improvements are possible as larger human hearts require the same technology

For the research, a biopsy of fatty tissue was taken from patients. The cellular and a-cellular materials of the tissue were then separated. While the cells were reprogrammed to become pluripotent stem cells, the extracellular matrix (ECM), a three-dimensional network of extracellular macromolecules such as collagen and glycoproteins, were processed into a personalized hydrogel that served as the printing "ink."

After being mixed with the hydrogel, the cells were efficiently differentiated to cardiac or endothelial cells to create patient-specific, immune-compatible cardiac patches with blood vessels and, subsequently, an entire heart. The use of "native" patient-specific materials is crucial to successfully engineering tissues and organs. The biocompatibility of engineered materials is crucial to eliminating the risk of implant rejection, which jeopardizes the success of such treatments. The researchers are now planning on culturing the printed hearts in the lab and "teaching them to behave like hearts. They then plan to transplant the 3D-printed heart in animal models. The cells need to form a pumping ability; they can currently contract, but we need them to work together. The possibility exists that in ten years, there will be organ printers in the finest hospitals around the world, and these procedures will be conducted routinely.

Source:

www.sciencedaily.com/releases/2019/04/190415102242.html

Deciphering the Walnut Genome

In a new study, a team of scientists at the University of California, Davis, and USDA's Agricultural Research Service (ARS) used a unique approach to sequence the genomes of the English walnut and its wild North American relative by tapping into the capabilities of two state-of-the-art technologies: long-read DNA sequencing and optical genome mapping. The resulting genome sequences are believed to be of the highest quality ever assembled of any woody perennial.



This approach could be applied to genome sequencing of trees and many other woody perennials, opening the door to a better understanding of the genetic blueprints of almonds, pecans, pistachios and grapes.

Like walnut, these other crops naturally cross-pollinate and are therefore highly variable. Variability has always greatly complicated our ability to produce a high-quality genome sequence for such crops, but these new technologies now make it possible.

The assembled genome sequences of the two walnut species also will now help researchers identify genetic markers that breeders can use to develop new varieties with improved pathogen and pest resistance.

Source:

www.usda-ars-comms-@subscribers.usda.gov

Forthcoming Tech Events

National

International Conference on Mechanical And Automobile Engineering

29-30th May, 2019

Rawalpindi

www.allconferencealert.net/eventdetails-arda.php

International Academic Conference on Engineering Technology & Innovations

28-29 June, 2019

Rawalpindi

www.academicworld.org/Conference2019

1st International Conference on Language, Literature and Culture

28-29 June, 2019

Rawalpindi

www.academicworld.org/Conference2019/Pakistan/1/ICLLC/

International Conference on Innovative Engineering Technologies

28-29 July, 2019

Rawalpindi

www.theires.org/Conference2019/Pakistan/1/ICIET/

International

International Conference on Engineering & Technology

1st-2nd June, 2019

New York USA

www.wrfconference.com/event/index

Wind Energy Science Conference 2019

17-20 June, 2019

Cork Ireland

www.wesc2019.org

International Conference of Electrical and Electronics Engineering

03-05 July 2019

London UK

www.10times.com/conference-electrical-electronics

International Conference on Recent Innovations in Engineering and Technology

1-2 September, 2019

United Arab Emirates

www.theiier.org/Conference2019/UAE/6/ICRIET/

Tech & Trade Offers

General Foundry Engineering Works

It was 1958 when General Foundry started its business activities in Gujranwala City in the supervision of Haji Abdul Aziz Batalvi as the founder of the Company.

At a time of rapid change, sudden alternations and constant progress, it was essential to be able to react effectively. Close cooperation, excellent service and first class quality has always formed the basis of this company. Over the years it has built a reputation for total service in the industry. Now in the year 2018 after 60 years of continuous hard work, General Foundry is the most reliable company having SBU's in casting products in the city. General Foundry is serving to repute his clients by providing best quality and reliable delivery with long-term experience. General Foundry has skilled labor for the work to be done & engaged in the manufacturing of following types of quality casting products. Crucibles for melting Aluminum, Zinc & Lead.



For all kinds of iron cast/dies and machinery parts or any queries, Kindly refer to our contact details.

**Mian Sansi Puli Near Siddique Sadiq Hospital,
Sheikhupura Road,
Gujranwala - Pakistan
Cell: +92 323-8106072, 0323-8106073
Phone number 055-4272862**

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 tis.pastic@gmail.com