PEERS ALLEY MEDIA

Global Conclave on

Future of Biosensors and Bioelectronics

June 20-21, 2024

Barcelona, Spain

Theme:

Discover the Latest Advancements in Biosensors and Bioelectronics: Exploring Innovative Applications and the Power of AI and Machine Learning

Future of BSBE 2024

advanced-biosensors-bioelectronics.peersalleyconferences.com

2 DAYS WITH MORE THAN 45 SESSIONS, KEYNOTES & ORAL PRESENTATIONS

INNOVATIVE FEATURED SPEAKERS **12+**

20+ HOURS OF NETWORKING EVENTS

INTERNATIONAL SPEAKERS **60+**

125+ EDUCATIONAL SESSIONS

WHO SHOULD ATTEND?

Biomedical Researchers | Pharmacists | Medical Professionals and Practitioners | Biotechnology and Biopharmaceutical Industry Professionals | Bioengineering and Biomedical Engineering Professionals | Academic Institutions and Research Organizations | Nanotechnologists | Chemical Engineers | Biochemists | Microbiologists | Biostatisticians | Data Scientists | Materials Scientists and Engineers | Electronics and Electrical Engineers | Microfluidics Researchers and Developers | Healthcare Entrepreneurs and Investors | Regulatory and Compliance Professionals in Healthcare and Biotech Industries | Government Policymakers and Regulators | Environmental Scientists and Researchers | Food and Agriculture Industry Professionals | Industrial Automation and Control Professionals | Aerospace and Defence Industry Professionals | Energy and Utilities Industry Professionals | Pharmaceutical and Drug Delivery Industry Professionals | Clinical and Diagnostic Laboratory Technicians and Managers | Healthcare IT Professionals | Data Scientists and Bioinformatics Professionals

PRESENTATION FORUM

KEYNOTE FORUM / MINI-PLENARY SESSIONS

Presentations under Keynote Forum or Mini-Plenary Sessions includes abstracts with remarkable research value selected by the program committee. These significant speeches are delivered by globally recognized honorable speakers and it is open to all registrants.

DISTINGUISHED SPEAKERS FORUM (ORAL ABSTRACT SESSIONS)

In this forum, speakers and experts of the research field gets an opportunity to showcase their noble research work that involves comprehensive research findings. These formal oral presentations include a wide range of talks covering basic research to advanced research findings in accordance to the theme and scientific sessions of the conference.

STUDENT FORUM

POSTER SESSION

This session is particularly introduced to encourage more number of student participation at international conferences, however it is not restricted only to students since it is also available for the participants with language barrier. There are specific guidelines to be followed to prepare the poster. Poster topic should be selected only from relevant scientific sessions with in-depth technical details.

YOUNG INVESTIGATORS FORUM

An exclusive opportunity for students and young investigators to present their research work through a formal oral presentation. Young Investigators Forum provides a global platform for young researchers and scholars to showcase their valuable contribution to the scientific world and to get acknowledged by the global scientific community of experts. It is an excellent opportunity to recognize young scientific assets with promising research ideas. These oral presentations are of shorter time duration with 10-15 minutes of informative and precise presentations in relevant scientific sessions.

EDUCATIONAL WORKSHOPS/ RESEARCH WORKSHOPS/ CORPORATE WORKSHOPS/MINI-SYMPOSIA

With an aim of transferring knowledge among the participants, workshops are introduced as a part of international conferences. These interactive and occasionally practical sessions gives an opportunity for participants to engage in detail discussion. Workshops are mostly scheduled for 60 to 90-minutes. It may range from learning about a specific topic relevant to international education, products and research which sometimes involves practical demonstration. It helps in enhancing skills, knowledge and understanding of the research field in depth through interactive discussions.

HIGHLIGHTS OF THE DAY SESSIONS

“Highlights of the Day Sessions” is introduced to discuss and focus a ray upon previous day ORAL ABSTRACT presentations by experts to summarise the key findings. It helps in getting better insights into the various dimensions of the topic.

MEET THE PROFESSOR @ NETWORKING SESSIONS

This session involves open discussion between the experts and session attendees, it gives enough time for getting answers to specific questions and doubts. It is an opportunity for attendees to increase their professional networking, sometimes also leads to an excellent collaboration opportunity.

EDUCATIONAL SESSIONS/ TRAINING PROGRAMS

Educational Sessions or training programs are specifically designed for a better understanding of the latest findings and technologies. These are generally 45-minute sessions that gives an exposure to the multidisciplinary field, that provides in-depth learning experiences and address educational needs.

TYPES OF ACADEMIC REGISTRATIONS

- Speaker Registration
- COMBO A (Registration + 2 Night Accommodation)
- COMBO B (Registration + 3 Night Accommodation)
- Delegate Registration

TYPES OF BUSINESS REGISTRATIONS

- Speaker Registration
- COMBO A (Registration + 2 Night Accommodation)
- COMBO B (Registration + 3 Night Accommodation)
- Delegate Registration

TYPES OF STUDENT REGISTRATIONS

- Registration
- YIF
- COMBO A (Registration + 2 Night Accommodation)
- COMBO B (Registration + 3 Night Accommodation)
- Posters

TYPES OF ADDITIONAL REGISTRATIONS

- Accompanying Person
- E-Poster
- Virtual Presentation
- Workshops
- Start-Ups

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TIME TO CONNECT WITH YOUR PEERS

CONCURRENT EDUCATIONAL SESSIONS

THURSDAY
JUNE 20
2024

- 2D Materials for Bioelectronics
- Advanced Bioelectronic Materials
- Advances in Bioelectronics
- Advances in Biosensor Technology

- Advances in Biosensors and Bioelectronics for Cancer Detection and Treatment
- Advances in Biosensors for Point-of-care Testing and Diagnostics

GROUP PHOTO | COFFEE BREAK

- Bioelectronics and Biocomputing For Synthetic Biology And Biotechnology
- Bioelectronics and Medical Devices
- Biosensors and Bioelectronics for Drug Discovery And Personalized Medicine

- Biosensors and Bioelectronics for Infectious Disease Detection And Control
- Biosensors and Bioelectronics for Neural And Brain-Machine Interfaces

LUNCH BREAK

- Biosensors and Bioelectronics for Non-Invasive Monitoring and Diagnostics
- Biosensors and Bioelectronics for Regenerative Medicine and Tissue Engineering

- Biosensors and Bioelectronics for Sports Medicine and Performance Monitoring
- Biosensors Design and Fabrication
- Biosensors for Health, Environment and Biosecurity

COFFEE BREAK

- Biosensors in Agriculture
- Biosensors in Food Processing, Safety, and Quality Control
- Biosensors involved in Drug Discovery
- Biosensors: Emerging Materials
- Calorimetric Biosensors
- Cell-based Biosensors

- Chemical Sensors and Biosensors
- CMOS Bioelectronics
- Conductive Hydrogels for Bioelectronics
- Cybersecurity and Ethical considerations

CONCURRENT EDUCATIONAL SESSIONS

FRIDAY
JUNE 21
2024

- Economics of Biosensors
- Electrochemical Biosensors
- Electrochemical Biosensors
- Electrochemical DNA Sensors

- Electronic Sensing Systems for Detecting and Monitoring Disease Outbreaks
- Emerging Biosensors and Bioelectronics for Veterinary and Animal Health Applications

GROUP PHOTO | COFFEE BREAK

- Graphene Bioelectronics
- Implantable Bioelectronics
- Integration of Artificial Intelligence and Machine Learning in Biosensors and Bioelectronics

- Intelligent and Biosensors
- Magnetoelastic Biosensors
- Mathematical Modelling of Biosensors
- Medical Applications of Biosensors

LUNCH BREAK

- Membranes used in Biosensors
- Microbial Nanowires
- Microfluidic Biosensors
- Molecular Optobioelectrnics
- Nanobiosensors

- Nanomaterials and Lab-on-a-chip Technologies
- Next-Generation Sequencing and Biosensors for Genomics and Proteomics Research
- Noninvasive Biosensors

COFFEE BREAK

- Piezoelectric Biosensors
- Printable and Flexible Bioelectronics
- Switchable Bioelectronics

- Transistor Based Biosensors
- Wearable Bioelectronics

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FEATURED TALKS

Title: Expansivity Measurements Made Using Capacitance Dilatometers between 2K and 873K

Speaker Name: Thomas L. Altshuler

Affiliation: Former owner of the Advanced Materials Laboratory, Inc, USA

Abstract:

Capacitance dilatometers have been used to measure the thermal expansivity of various materials from 2K to 873K. Expansivity measurements were made using an Andeen Hagerling bridge with a 0.5 attofarad sensitivity and a ten digit readout. Expansivity readings were made every degree Kelvin for both warming and cooling of the specimens. For temperatures between 293K and 873K a push rod dilatometer was used within a furnace to measure thermal expansivity of silicon. The hysteresis loop between the warming and cooling curves was less than 7 μstrain. The specimen chamber had helium that did not flow during the tests. For temperatures between 2K and 293K two types of dilatometers were used. One was a hanging capacitance disk supported by three specimens of a graphite resin composite. As the specimen changed length the bottom capacitance disk, attached at the bottom of the specimens, moved relative to the top capacitance disk which was attached to the top of the specimens. The other dilatometer was a push rod dilatometer.

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FEATURED TALKS

Title: Single Nanoparticle Molecule Sensors for Imaging of Single Live Cells

Speaker Name: X. Nancy Xu

Affiliation: Old Dominion University, USA

Abstract:

Innovative sensing and imaging tools for probing functions of individual live cells in a highly heterogenous cell population in real time would revolutionize early disease diagnosis and treatments. Current tools are unable to real-time probe molecular functions of single live cells with adequate quantitation, spatial and temporal resolutions and over an extended period of time. We have pioneered the development of a suite of highly innovative nanobiotechnologies, including photostable single plasmonic nanoparticle imaging probes, single molecule nanoparticle optical biosensors, and far-field photostable optical nanoscopy (PHOTON). We have demonstrated that these new tools can overcome the drawbacks of fluorescence-based imaging platforms for dynamic, single molecule and multiplexing imaging of single live cells with superior temporal and spatial resolutions and over a desired extended period of time. We have used these new tools to real-time study: (i) molecular cascades of signaling transduction pathways of single live cells, (ii) molecular mechanisms of multidrug resistance of single live cells, (iii) efficacies of individual drug nanocarriers, (iv) rare subsets of single cancer stem cells in tissue, and (v) native environments of developing embryos. In this plenary presentation, I will describe the design and development of these innovative single-nanoparticle optical biosensors and their wide ranges of applications. The work was supported by NIH and NSF.

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FEATURED TALKS

Title: From Intelligent Sensors to Digital Twin for Healthcare

Speaker Name: Xueji Zhang

Affiliation: Shenzhen University, China

Abstract:

The convergence of biosensors and artificial intelligent technology represents a pivotal advancement in the healthcare domain. This presentation embarks on a journey exploring the transformative potential of harnessing intelligent biosensors to create digital twins for healthcare applications. It delves into the evolution of biosensor technology and its critical role in the realization of digital healthcare ecosystems.

The presentation will commence with an overview of intelligent biosensors, showcasing their development, capabilities, and the diverse range of applications within the healthcare sector. Emphasis will be placed on the continuous improvements in biosensor accuracy, miniaturization, and connectivity, which are fundamental in gathering real-time physiological data. Subsequently, we will delve into the concept of digital twins and their relevance in healthcare. Digital twins are virtual representations of real-world entities, and in the context of healthcare, they serve as dynamic models of patients, enabling personalized and proactive healthcare interventions. We will discuss the integration of biosensor data into digital twin models, facilitating the creation of highly accurate and responsive patient profiles. Furthermore, this presentation will highlight emerging trends and future directions, including the potential for real-time remote patient monitoring, predictive diagnostics, and the advancement of precision medicine through digital twins.

In conclusion, the presentation aims to provide a comprehensive understanding of the journey from intelligent biosensors to digital twins for healthcare. Attendees will gain insights into the technological advancements, ethical considerations, and transformative potential that this fusion of technologies brings to the healthcare landscape.

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FEATURED TALKS

Title: Microfluidic Sliding Paper-Based Device for Point-of-Care Determination of Albumin-to-Creatine Ratio in Human Urine

Speaker Name: Szu-Jui Chen

Affiliation: National Cheng Kung University, Taiwan

Abstract:

This paper presents a novel assay platform comprising a microfluidic sliding double-track paper-based chip and a handheld Raspberry Pi detection system for the quantification of the albumin-to-creatinine ratio (ACR) in human urine. The ACR is a clinically significant parameter with implications for the early detection of conditions such as renal insufficiency. In this proposed method, the microchip's sliding layer facilitates the movement of the urine sample through two parallel filtration channels, directing it to the reaction and detection areas of the chip, thus enabling the completion of the detection reaction. This straightforward approach is well-suited for self-diagnosis of the ACR index in human urine. The assay relies on the analysis of RGB (red, green, and blue) value intensity signals generated by the reaction complexes in these two reaction zones, with data processed by a Raspberry Pi computer to derive ACR values, specifically albumin (ALB) and creatinine (CRE) concentrations. These results demonstrate a linear relationship between the G + B value intensity signal and the ALB and CRE concentrations, yielding correlation coefficients of R2 = 0.9919 and R2 = 0.9923, respectively. Furthermore, this proposed result conducted a validation study using 23 urine samples obtained from patients suffering from chronic kidney disease (CKD), confirming that the ALB and CRE concentration results obtained through our proposed method closely align with those acquired using a conventional high-reliability macroscale method. In summary, our findings establish the utility of our method as a convenient, real-time, reliable, and cost-effective solution for point-of-care CKD diagnosis and monitoring in clinical applications.

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FEATURED TALKS

Title: A CRISPR-Cas System -Based Metal-Enhanced Light-Up Aptamer Fluorescence Biosensor for Profiling Exosome-Associated Breast Cancer

Speaker Name: Yan Jiaxiang

Affiliation: The Hong Kong Polytechnic University, Hong Kong

Abstract:

Cancer cells possess the ability to instruct other cells within the tumor microenvironment through a paracrine mechanism, facilitated by the secretion of nano-sized extracellular vesicles, specifically exosomes (Exo). This process contributes to the rapid expansion of tumor mass. Exosomes have been identified as potential prognostic, diagnostic, and therapeutic agents, possessing specific biomarkers in patients with various tumor types. This is due to the fact that the exosomal cargo, rich in information, can mirror alterations in metabolic and proteomic profiles of the originating tumor cells. However, the analysis of exosomal protein markers in blood samples presents a significant challenge due to the extensive sample preparation required and the lack of sufficient sensitivity. To overcome this obstacle, we have engineered a novel metal-enhanced light-up aptamer fluorescence biosensor, leveraging the recognition and amplification capabilities of the CRISPR-Cas system. Our newly developed detection platform offers selective and sensitive detection by (i) amplifying the metal-enhanced light-up aptamer fluorescence signal and (ii) utilizing the CRISPR-Cas signaling amplification system for sensitive exosomal protein detection, thereby characterizing cancer cells. In summary, we posit that our CRISPR-Cas System-Based Metal-Enhanced Light-Up Aptamer Fluorescence Biosensor for exosome detection not only introduces a novel tool for the detection of exosomal proteins and cancer diagnosis, but also suggests a new strategy for the detection of non-nucleic acid analytes using the CRISPR-Cas system.

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FEATURED TALKS

Title: A Health data analytics maturity model for hospitals information systems

Speaker Name: Alvaro Rocha

Affiliation: University Of Lisbon, Portugal

Abstract:

In the last five decades, maturity models have been introduced as reference frameworks for Information System (IS) management in organizations within different industries. In the healthcare domain, maturity models have also been used to address a wide variety of challenges and the high demand for Hospital IS (HIS) implementations. The increasing volume of data exceeds the ability of health organizations to process it for improving clinical and financial efficiencies and quality of care. It is believed that careful and attentive use of Data Analytics in healthcare can transform data into knowledge that can improve patient outcomes and operational efficiency. A maturity model in this conjuncture, is a way of identifying strengths and weaknesses of the HIS maturity and thus, find a way for improvement and evolution. This speech presents a proposal to measure Hospitals Information Systems maturity regarding Data Analytics. The outcome is a maturity model, which includes six stages of HIS growth and maturity progression.

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FEATURED TALKS

Title: **An Innovative Prosopis Cineraria Pod Aqueous Waste as Natural Inhibitor for Enhancing Unsaturated Lipids Production in Yeast Cell Using Banana Peel**

Speaker Name: Prashant Kumar

Affiliation: RMIT University, Australia

Abstract:

Yeast-produced Single Cell Oil (SCO) stands out as a promising alternative owing to its elevated lipid yield within confined spatial parameters, coupled with the inherent ability to manipulate lipid quality. In this investigation, banana peel serves as the carbon source for biotransformation by Rhodotorula mucilaginosa into lipids. Additionally, the lipid's quality and quantity are augmented through the utilization of discarded aqueous Prosopis cinerareia pod extract as a natural inhibitor.Quantification of the P. cineraria aqueous extract, accomplished through High-Performance Liquid Chromatography (HPLC), revealed the presence of phenylpropenoids, including epicatechin (0.068%), gallic acid (0.29%), quercetin (0.34%), epigallocatechin (0.091%), rutin (0.141%), ellagic acid (0.141%), along with glucose (1.22%) and sucrose (2.36%). Subsequently, sucrose and glucose were isolated from the aqueous extract and characterized through Nuclear Magnetic Resonance (NMR) and Thermogravimetric Analysis (TGA). This natural inhibitor proves advantageous compared to the chemical inhibitor (statin) concerning lipid production with desirable quality. The inhibition occurs through blocking the yeast competitive mevalonate pathway, promoting heightened lipid accumulation in microbial cells. The anti- cholesterolemic activity of this natural inhibitor potentially influences lipid accumulation by impeding the mevalonate pathway. The collaborative action of reducing sugars and phenylpropenoids synergistically enhances the accumulation of unsaturated lipids in microbial cells.Phenylpropenoids may inhibit the key enzyme HMG reductase, which governs the mevalonate pathway for ergosterol formation, thereby inducing lipid accumulation. The isolation of lipids from yeast cells is optimized using a green solvent, namely liquid-CO2. This liquid-CO2 extract is enriched with unsaturated lipids (46.96%), including ω-fatty acids such as linoleic (17.61%) and linolenic (5.35%). Consequently, SCO is generated utilizing food waste both as a carbon source and an inhibitor, and the resulting lipid is deemed natural and suitable for nutritional purposes.

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FEATURED TALKS

Title: Semiconductivity in Molecules of Life

Speaker Name: Vengadesh Periasamy

Affiliation: Universiti Malaya, Malaysia

Abstract:

Molecular biology has been moving towards development of high throughput, small-scale platforms for various applications from medical research to molecular diagnostics. Advancedtechnologies, although mostly precise and sensitive, are expensive, time-consuming and require laboratory equipment and technical expertise. In addition, these tools are designed totarget certain types of biomaterials (genomics and proteomics), or even more specific target samples (specific protein arrays). Hence, there is lack of a universal tool capable of identification of living organisms through detection of biomolecules (DNA, RNA, proteins) or characterization of cells in a rapid, cost-effective and user-friendly manner. The novelty of the proposed technology however originates from the individually specific electronic nature of the biomaterial of interest. Looking at biomaterials and living organisms from an electronicpoint of view is a very interesting research subject which has never been put into practice commercially. The electronic method developed involves direct measurements of electronic fingerprinting signals from the respective biological (or non-biological) materials. Using the idea of semiconductivity (for the first time) and other characteristic electronic properties, we have developed a first of its class of patented solid-state sensors which can detect electronicsignals arising from nucleic acids and cells and convert them into quantitative solid-state parameters. Integrated within a fully electronic Lab-on-PCB system now named eProfiler-L and operated via a Cloud-based platform, these signals can then be analyzed to help characterize and identify unknown samples. The technology relies on the electronic properties and charge transfer capabilities of the biomolecules in solution, thin film or monolayer forms. Based on how the sample reacts or ‘behaves’ when exposed to an electricfield, a characteristic eProfile is created. This behavior is attributed to the interactions at the sample/electrode interface without the need for any reagents (enzymes, antibodies, dyes, etc.). Therefore, the fingerprint eProfiles can also be scrutinized to yield surprisingly novel insights into understanding various elusive cellular and biological pathways. In this lecture, I will explain the fundamentals behind these eProfiles and how the eProfiler-L platform will be instrumental towards establishing the first fully digital database of pathogens and biomolecules for digital diagnosis (eDiagnostics) and connected healthcare in the nearfuture.

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FEATURED TALKS >>>

Title: Recent Advances of Magnetic Gold Hybrids and Nanocomposites, and Their Potential Biological Applications

Speaker Name: Mirza Muhammad Faran Ashraf Baig

Affiliation: The Hong Kong University of Science and Technology, HKSAR, China

Abstract:

Magnetic gold nanoparticles (mGNP) have become a great interest of research for nanomaterial scientists because of their significant magnetic and plasmonic properties applicable in biomedical applications. Various synthetic approaches and surface modification techniques have been used for mGNP including the most common being the coprecipitation, thermal decomposition, and microemulsion methods in addition to the Brust Schiffrin technique, which involves the reduction of metal precursors in a two-phase system (water and toluene) in the presence of alkanethiol. The hybrid magnetic–plasmonic nanoparticles based on iron core and gold shell are being considered as potential theragnostic agents. Herein, in addition to future works, we will discuss recent developments for synthesis and surface modification of mGNP with their applications in modern biomedical science such as drug and gene delivery, bioimaging, biosensing, and neuro-regenerative disorders. I shall also discuss the techniques based on my research related to the biological applications of mGNP.

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FEATURED TALKS

Title: Characterization of Alginate–Gelatin–Cholesteryl Ester Liquid Crystals Bioinks for Extrusion Bioprinting of Tissue Engineering Scaffolds

Speaker Name: Alyaa Idrees Abdulmaged

Affiliation: Universiti Tun Hussein Onn Malaysia, Malaysia

Abstract:

Bioink development is an innovative approach to fabricate bio-substitutes for tissue engineering applications. The research on bioink attempts to offer a 3D complex architecture and control cellular behavior that improve cell physical properties and viability. This research proposed a new multimaterial bioink based on alginate (A), gelatin (G), and cholesteryl ester liquid crystals (CELC) biomaterials, namely (AGLC) bioinks. The development of AGLC was initiated with the optimization of different concentrations of A and G gels to obtain a printable formulation of AG gels. Subsequently, the influences of different concentrations of CELC with AG gels were investigated using a microextrusion-based 3D bioprinting system. The AGLC bioinks were formulated using AG gel with 10% w/v of A and 50% w/v G (AG10:50) and 1%, 5%, 10%, 20%, and 40% of CELC, respectively. The printed filament has a minimum width of 1.3 mm at a 1 mL/min extrusion rate with 10% w/v A, 50% w/v G, and 40% v/v CELC (AGLC40). Post-printing polymerization of the AGLC bioinks with calcium (Ca^{2+}) ions shows well-defined and more stable structures. The physicochemical and viability properties were examined by FTIR, DSC, contact angle, FESEM, MTT assay, and cell interaction evaluation methods. The FTIR spectra of the AGLC bioinks exhibit a combination characteristics vibration of AG10:50 and CELC. The DSC analysis indicates the high thermal stability. Wettability analysis shows a reduction in the water absorption ability of the AGLC bioinks. FESEM analysis indicates that the surface morphologies of the bioinks exhibit varying microstructures. In vitro cytotoxicity by MTT assay shows the ability of the bioinks to support the biological activity of HeLa cells. The AGLC bioinks show average cell viability of 82.36% compared to the control (90%). Furthermore, cultured cells on the surface of AGLC bioinks showed that bioinks provide favorable interfaces for cell attachment

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FEATURED TALKS

Title: State of the art review on automatic sorting system

Speaker Name: Thierno Gueyee

Affiliation: Northwestern Polytechnical University, China

Abstract:

The idea for the Internet of Robotic Things (IoRT) comes from activities. IoRT allows smart devices to combine sensor information from multiple sources, use broader nearby insights to determine the best reason for the activity and display events on-screen. The Internet of Things can connect web applications to other gadgets to make them smarter. Automated engineers combine the two and arm themselves with sensors that can analyze the current situation. Mechanical improvements such as ordinary voice links (PC) vision sensor innovations and artificial intelligence (AI) have resulted in a turn of events and programmed placement frameworks under advanced machinery. This article examines frameworks for arranging programmed objects to assemble robots and innovative patterns in ordinary language programmed programming, and three-dimensional (3D) visual insight. The relevant statement "regulation scene" should describe the combination of all three modules. This computation enables people to relate through a three-tiered information scene and guides managers to use discourse to provide reasonable criteria whenever an order is legitimate. After receiving precise criteria, the robot can use this diary's planned execution calculations and programmed programming to direct the placement of programmed items. The play area provides a context for the natural product, while the landscape design provides a valuable part of the framework.

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FEATURED TALKS

Title: EEG changes in intensive care patients diagnosed with COVID-19: a prospective clinical study

Speaker Name: Javid Shafiyev

Affiliation: University of Health Sciences Gulhane Faculty of Medicine Department of Neurology, Ankara, Turkey

Abstract:

Introduction:

Coronavirus disease (COVID-19) is an infectious disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The disease was declared a pandemic on March 11th, 2020, by the World Health Organization (WHO). There has been a substantial increase in the epileptic seizures and status epilepticus reported in the pandemic period. In this context, it is aimed with this study to identify the electroencephalography (EEG) features of patients admitted to the intensive care unit with the diagnosis of COVID-19 and to look for any specific patterns in these features.

Material and method:

The material of this study primarily comprised the neurological evaluations and continuous EEG recordings of 87 intensive care patients who were diagnosed with COVID-19. In addition, demographic and clinical features and comorbid conditions of these patients were also analyzed, and any correlation thereof was investigated.

Results:

The EEG data of 87 patients who were diagnosed with COVID-19 and were followed up in the intensive care unit were recorded and then analyzed. Abnormal EEG findings were detected in 93.1% (n = 81) of the patients, which were found to increase significantly with age ($p<0.001$). The mean age of patients with specific epileptiform abnormalities on EEG was found to be significantly higher than those with non-specific abnormalities. Epileptiform discharges were seen in 37.9% (n = 33) of the patients. Nonconvulsive status epilepticus (NCSE) was detected in 5.7% of the patients, and antiepileptic drugs were started in 25 (28.7%) of the patients.

Discussion:

Statistically significant EEG changes were observed in the continuous EEGs of the patients followed up in the intensive care unit due to COVID-19 infection. However, further studies are needed to associate the EEG changes observed in the COVID-19 patients with the epileptogenesis of COVID-19 infection.

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FEATURED TALKS

Title: Investigating the Potential of Lipids for Use as Biomarkers for Glioblastoma via an Untargeted Lipidomics Approach

Speaker Name: Serap Sahin Bolukbasi

Affiliation: Afyonkarahisar Health Sciences University, Turkey

Abstract:

The types and functions of lipids involved in glioblastoma (GB) are not well known. Lipidomics is a new field that examines cellular lipids on a large scale and novel aplication of lipidomics in the biomedical sciences have emerged. This study aimed to investigate the potential of blood lipids for use as biomarkers for the diagnosis of GB via untargated lipidomic approach. Gaining a deeper understanding of lipid metabolism in patients with GB can contribute to the early diagnosis with GB patiens and also development of novel and better therapeutic options. This study was performed using blood samples collected from 14 patients (eight females and six males) and 14 controls (eight females and six males). Lipids were extracted from blood samples and quantified using phosphorus assay. Lipid profiles of between patients with GB and controls were compared via an untargeted lipidomics approach using 6530 Accurate-Mass Q-TOF LC/MS mass spectrometer. According to the results obtained using the untargeted lipidomics approach, differentially regulated lipid species, including fatty acid (FA), glycerolipid (GL), glycerophospholipid (PG), saccharolipid (SL), sphingolipid (SP), and sterol lipid (ST) were identified between in patients with GB and controls. Differentially regulated lipids were identified in patients with GB, and these lipid species were predicted as potential biomarkers for diagnosis of GB.

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FEATURED TALKS

Title: Long-Term Clearance and Biodistribution of Magnetic Nanoparticles Assessed by AC Biosusceptometry

Speaker Name: Erick Guilherme Stoppa

Affiliation: São Paulo State University - UNESP, Brazil

Abstract:

Once administered in an organism, the physiological parameters of magnetic nanoparticles (MNPs) must be addressed, as well as their possible interactions and retention and elimination profiles. Alternating current biosusceptometry (ACB) is a biomagnetic detection system used to detect and quantify MNPs. The aims of this study were to evaluate the biodistribution and clearance of MNPs profiles through long-time in vivo analysis and determine the elimination time carried out by the association between the ACB system and MnFe2O4 nanoparticles. The liver, lung, spleen, kidneys, and heart and a blood sample were collected for biodistribution analysis and, for elimination analysis, and over 60 days. During the period analyzed, the animal's feces were also collectedd. It was possible to notice a higher uptake by the liver and the spleen due to their characteristics of retention and uptake. In 60 days, we observed an absence of MNPs in the spleen and a significant decay in the liver. We also determined the MNPs' half-life through the liver and the spleen elimination. The data indicated a concentration decay profile over the 60 days, which suggests that, in addition to elimination via feces, there is an endogenous mechanism of metabolization or possible agglomeration of MNPs, resulting in loss of ACB signal intensity.

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FEATURED TALKS

Title: Developing an electrochemical non-enzymatic biosensor based on PdNPs/Carbon dots/Silica hybrid Nanostructure

Speaker Name: Thiago Canevari

Affiliation: Mackenzie Presbyterian University, Brazil

Abstract:

The hybrid nanostructures formed by PdNPs/Carbon dots/Silica were prepared in a single step, without external catalysts, by mixing TEOS with PdNPs/Cdots, where the Cdots have been previously prepared by electrochemical means using n-propanol as carbon source. Palladium nanoparticles (PdNPs) containing Cdots (PdNPs-Cdots) were prepared from the palladium chloride complex Na2[PdCl4]. The printed carbon electrode, CSE, was used as a working electrode, which had its surface modified by adding 60 uL of an aqueous solution of the PdNPs/Carbon dots/SiO2 nanostructure. The CSE/PdNPs/Carbon dots/SiO2 electrode showed an excellent electrocatalytic response for the simultaneous determination of dopamine and serotonin in the presence of AA, as shown in figure 1, in which the electrocatalytic current increased, I, proportionally in function of the increase concentration, for both species. Measurements were performed differential pulse voltammetry in PBS, pH 7.0, in the presence of ascorbic acid, with the attention fixed at 1 x 10-4 mol/l and concentrations of dopamine and serotonin ranging from 5 x 10 -7 to 7 x 10 -6 mol/L. The detection limits were 36 nmol L-1 of dopamine and 33 nmol L-1 of serotonin.

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FEATURED TALKS

Title: Prospective evaluation of the Hill model in nanomaterials' bioassays

Speaker Name: Paulo Cesar De Morais

Affiliation: Catholic University of Brasilia, Brazil

Abstract:

This talk presents a prospective immersion on the Hill's model, introduced more than a century ago, initially aiming to explain the binding of oxygen molecules to hemoglobin and subsequently used to explain a huge variety of biological data. Evaluation of cell viability using standard approaches (e.g. MTT bioassay), challenged by a particular bioactive compound, including bioactive nanomaterials, is among the experiments Hill's model has been currently applied. More recently, however, the Hill model was successfully and pioneering extended to account for the standard disc diffusion (DD) bioassay traditionally used to evaluate antimicrobials. Nevertheless, even after half of a century has passed since the "NANO" term was coined and introduced into the scientific literature, proposal on how to incorporate the morphological characteristics (mean size and size dispersity) of a nanomaterial in the description of in vitro bioassays, as for instance MTT and DD assays, is very much recent. Moreover, in recent years, the standard Hill's model has been used to describe standard cell viability assays performed with nanomaterials. In view of this gap in the literature, the present talk aims to present a recently-developed Hill-inspired model that successfully accounts for the description of MTT and DD assays performed with nanomaterials, emphasizing the impact of the mean size and size dispersity in the biological response. The concept of "biological polydispersity" of a nanomaterial is then introduced, meaning the size characteristics of a nanomaterial while recognized by a particular biological assay. Last, but not least, for a nanomaterial, the "biological polydispersity" is compared with the morphological polydispersity, the latter assessed from high-resolution microscopy micrographs.

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FEATURED TALKS

Title: The synergistic effect of using bacteriophages and chitosan nanoparticles against pathogenic bacteria as a novel therapeutic approach

Speaker Name: Aghapy Yermans Yakoup

Affiliation: Zewail City for Science and Technology, Egypt

Abstract:

Public health and environmental security are seriously at risk due to the growing contamination of pathogenic microorganisms. Therefore, effective antimicrobials are urgently needed. In our study, the antimicrobial effects of three types of nanoparticles were investigated with phage. The biosynthesis of nanoparticles was confirmed based on the color change and shapes, which tended to be mono-dispersed with a spherical shape with a size range of 20–35 nm for Ag-CS-NPs; 15–30 nm for Phage-CS-NPs (Ph-CS-NPs); and 5–35 nm for Propolis-CS-NPs (Pro-CS-NPs). Nanoparticles displayed peaks between 380-420 nm, 335–380 nm, and below 335 nm for Ag-CS-NPs, Pro-CS-NPs, and Ph-CS NPs, respectively. Throughout the three synthesized nanoparticles, Ag Cs NPs represented a higher antibacterial effect in combination with phages. It showed MIC against S. sciuri, S. Typhimurium, and P. aeruginosa between 31.2 and 62.2 µg/mL and MBC at 500, 62.5, and 31.2 µg/mL, respectively, while in combination with phages showed MIC at 62.2, 31.2, and 15.6 µg/mL, respectively and MBC at 125, 62.2, and 15.6 µg/mL, respectively. Furthermore, a significant killing efficiency was observed with 16.5–30.1 µg/mL of Ag-CS NPs combined with phages. In conclusion, Ag-CS-NPs with phages present potential bactericidal and inhibitory effects against Gram-positive and Gram-negative bacteria, as well as against the production of biofilms.

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FEATURED TALKS

Title: Evaluation of the effectiveness of propolis-pollen nano-emulsion against MDR E. coli O157 treatment in the broiler

Speaker Name: Dalia Mohammed Ali Ragab Elmasry

Affiliation: Agricultural Research Center (ARC), Egypt

Abstract:

Escherichia coli O157 causes huge chicken industry losses. Propolis and pollen have many biological qualities, however, their limited water solubility makes them challenging to employ. Nanotechnologies allow propolis and pollen nanoemulsions to be produced to increase their qualities.

Propolis pollen nanoemulsions (PP-NE) were tested for antibacterial activity, relative expression of toxin genes (eaeA, fimC, stx1, stx2, cnf1/2, hlyA, iss, and ompA) and ESBL-resistant genes (blaTEM, blaSHV, and AmpC), and histopathological changes on E. coli O157 infected broiler chicks as an alternative to antibiotics or in combination with ofloxacin.

The PP-NE minimum inhibitory concentration was detected 12.5%. A total of 120 one-day-old chicks were placed into six groups: Group 1 was a negative control (non-infected, untreated); Group 2 was a positive control (infected with E.coli O157); Group 3 was supplemented with PP-NE only (0.5 mL/mL water/10 days); Group 4 was supplemented with PP-NE and infected; Group 5 was supplemented with ofloxacin (10 mg/kg body weight/ /for 5 days) and infected; and Group 6 was supplemented with ofloxacin (same dose)+ PP-NE (same dose). All groups were raised for 21 days and daily clinical symptoms and mortality were recorded.

At the 10 days post-inoculation, PP-NE+ ofloxacin chicks had weak lesions, less mortality, and E. coli O157 count. Ofloxacin concentrations in tissues were detected 24 h after the last oral dosage then drop consistently and staying above the LOQ for 72 h. The PP-NE+ ofloxacin group had the lowest relative expression of E.coli O157 toxin and ESBL-resistant genes. As conclusion

E. coli O157-infected broiler hens treated with nanomaterials and antibiotics had milder lesions and lower toxin and antibiotic-resistant gene expression.

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FEATURED TALKS

Title: Navigating SARS-CoV-2 Transmission: Detection and Adsorption Perspectives

Speaker Name: Daniela Dobrynin

Affiliation: Technion – Israel Institute of Technology, Israel

Abstract:

The emergence of SARS-CoV-2 in late 2019 triggered a global pandemic and rapidly developed several mutated variants, specifically the Delta and Omicron, characterized by higher transmissibility and escalating infection cases worldwide. Aerosol transmission via human-to-human contact is the primary transmission pathway. Another possibility is through contact with SARS-CoV-2-contaminated surfaces. This pandemic emphasized the importance of understanding the transmission mechanism and early detection of infected patients to reduce the viral spread.

Rapid Antigen Tests (RATs) have emerged as a widely adopted solution for SARS-CoV-2 detection since they offer an easy-to-use kit and rapid results. The RAT detects the nucleocapsid protein, which is naturally located inside the virus. However, the sensitivity varies between the commercially available kits, and the test result might fluctuate due to diverse factors. Here, we assess the detection limit of seven commercially available RATs by introducing them to known amounts of the nucleocapsid protein from the Omicron variant.

It allowed to establish the detection limits while eliminating the influence of external factors. Our results reveal a detection limit ranging between protein concentrations of 9.8–78.6 ng/mL in the test solution, highlighting both the general detection limits of RATs and the substantial variation among different RATs, underscoring the need for improvement.

Quartz Crystal Microbalance (QCM), a robust biosensing platform, offers another approach to studying SARS-CoV-2 transmission. We compared the adsorption capacities of Spike protein subunits from the original, Delta, and Omicron variants on self-assembled monolayers using QCM. Results indicated significant differences among variants and subunits. Omicron exhibited enhanced adsorption compared to Delta, surpassing the original strain. Additionally, we explored pH conditions, finding the strongest adsorption at pH 7.4, which mirrors physiological conditions. Our study underscores a robust correlation between Spike protein adsorption capacity and the transmissibility of SARS-CoV-2 variants.

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FEATURED TALKS

Title: Synergistic Advancements: Integration of Artificial Intelligence and Machine Learning in Biosensors and Bioelectronics

Speaker Name: Koffka Khan

Affiliation: The University of the West Indies, Trinidad and Tobago

Abstract:

The integration of Artificial Intelligence (AI) and Machine Learning (ML) techniques into biosensors and bioelectronics has ushered in a transformative era in the fields of healthcare, biotechnology, and environmental monitoring. This discussion explores the symbiotic relationship between AI/ML and biosensing technologies, highlighting their collaborative potential in enhancing sensitivity, accuracy, and real-time data analysis.

Biosensors, traditionally reliant on biochemical recognition elements, have greatly benefited from AI-driven data processing. Machine Learning algorithms enable rapid, automated data interpretation, enabling biosensors to detect and quantify analytes with unprecedented precision. Moreover, AI has facilitated the development of self-calibrating biosensors, reducing the need for constant recalibration and maintenance.

Bioelectronics, on the other hand, have leveraged AI for signal amplification and noise reduction. Neural networks and deep learning algorithms have been pivotal in deciphering complex electrochemical and physiological signals, paving the way for novel diagnostic tools and therapeutic interventions. AI-driven bioelectronic devices have been particularly impactful in personalized medicine, where they enable tailored treatment strategies based on real-time patient data.

Furthermore, AI and ML have revolutionized sensor design and optimization. Generative algorithms can rapidly explore a vast design space, leading to the creation of highly sensitive and specific biosensors. Additionally, AI-powered simulation and modeling have streamlined the prototyping process, accelerating the development of next-generation biosensing technologies.

In conclusion, the integration of AI and ML into biosensors and bioelectronics represents a powerful synergy that promises to reshape healthcare, environmental monitoring, and beyond. The collaborative efforts of these fields hold immense potential for early disease detection, personalized medicine, and sustainable resource management, offering a brighter future for human health and the environment.

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FEATURED TALKS

Title: **Adaptive user interface based on accessibility context**

Speaker Name: Yousra Bendaly Hlaoui

Affiliation: University Of Tunis El Manar, Tunisia

Abstract:

The substantial involvement of Adaptive User Interfaces (AUI) in providing adaptive and accessible interactive systems has created the need to establish a multimodal framework based on scalable adaptation rules. This paper presents an Adaptive User Interface to Accessibility Context (AUIAC) framework that provides a generic adaptation approach according to the model-driven engineering. It is based on a sequential and layered transformation from platform independent model (PIM) to platform specific model (PSM). It supports different reifications and transitions using adaptive transformation rules specified for each disability and modality. We illustrate the application of some rules on a sample user interface for the case of blind people. Then, we present some usability evaluation results from an empirical study.

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FEATURED TALKS

Title: Synergistic integration of wastewaters from second generation ethanol plant for algal biofuel production

Speaker Name: Preeti Mehta Kakkar

Affiliation: Indian Oil Corporation Limited

Abstract:

This study introduces system for algal biofuel production that synergistically integrates with treatment and usage of chemicals in waste waters generated from 2G ethanol pretremnet plant. The study was conducted using a mixture of wastewaters of pH 4.3 generated after washing of acidic and alkaline-soaked lignocellulosic biomass prior to pre-treatment process. The growth studies indicated that the inhouse developed thermotolerant strain of Chlorella pyrenoidosa M18 exhibited higher cell proliferation in wastewaters as compared to freshwater. About 20–25% enhancement in biomass and lipid productivity was observed in Mixed Waste waters (MW). The spent wastewater medium obtained after harvesting the auto-flocculated biomass was also reused up to three successive growth cycles. The recycled medium without any nutrient addition could be used for two subsequent rounds with enhanced biomass (520 mgL−1d−1 ± 4.07) and lipid (157.71 mgL−1d−1 ± 1.09) productivities. This synergistic approach of cultivating thermotolerant microalgae with wastewater from 2G pre-treatment plant provides an economical setup for development of commercial algal biofuel technology.

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FEATURED TALKS

Title: Short-Term and Long-Term Stability of Medial Olivocochlear Reflex in Adults with Typical Hearing

Speaker Name: S. Ruba

Affiliation: SRM Institute of Science and Technology

Abstract:

Objective: This study aimed to assess the stability of Medial Olivocochlear Reflex (MOCR) function in typical hearing adults with the use of Contralateral Suppression (CS) of Distortion Product Otoacoustic Emissions (DPOAEs).

Method: This study included fifty-three (90 ears) participants between the ages of 18-30. Participants were divided into 3 groups (Group A-daily stability, Group B-short-term stability, and Group C- long-term stability). For each group, 4 measurements (30 × 4 = 120sessions) were taken. Group A measurements were taken daily, Group B measurements were taken weekly and Group C measurements were taken monthly. DPOAEs and Contralateral Suppression of DPOAEs were measured for each group.

Results: Analyses indicated that Medial Olivocochlear Reflex (MOCR) measured through contralateral suppression of DPOAE was unstable. This result indicates a DPOAE-based measure of the MOCR was not repeated across time. Figure 1. displays the reliability metrics for contralateral suppression of DPOAE during daily, short-term, and long-term test sessions.

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FEATURED TALKS

Title: Development of advanced nanostructures-based platforms for sensing and removal of pollutants from aqueous solutions

Speaker Name: Monika Nehra

Affiliation: Panjab University

Abstract:

In current era, technological advancements and industrialization are excessively burdening the environment through the release of hazardous waste in large quantities, e.g., pesticides, antibiotics, heavy metals, and others. These contaminants can cause serious damage to ecosystem by inducing serious health issues in humans and animals. Recent technological advancements based on nanomaterials have allowed the development of novel techniques for detection of these contaminants. These techniques can offer several advantages over laborious and complex conventional techniques (like ELISA and chromatography), e.g., fast detection, simple sample preparation, easy to operate, in situ sampling, on-site detection, and reduced cost. Here, we have discussed colorimetric/fluorescent platforms based on nanomaterials for detection of contaminants. After the detection of contaminants, it is imperative to develop the treatment approaches in order to clean the water resources. In comparison to conventional water treatment methods (such as flocculation, filtration, chlorine disinfection, and sedimentation), the nanomaterials-based treatment processes (especially adsorption) can offer remarkable performance in removal of these contaminants. Here, synthesis of different nanostructures is discussed that can be effectively utilized as nano-adsorbents.

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FEATURED TALKS

Title: Complete degradation of the endocrine disruptor di-ethylhexyl) phthalate by Brevibacillus brevis strain and its application to bioremediation of contaminated soil

Speaker Name: Madhavi Rashmi

Affiliation: Patliputra University

Abstract:

Phthalates are a class of compounds which is made up of esters of phthalic anhydride. DEHP (di-2-ethyl hexyl phthalate) is widely used as a plasticizer and it adversely affects humans. In this study, different promising DEHP-degrading strains had been isolated from rubbish landfill soil. The selected bacterial strain was capable of consuming DEHP as a sole source of carbon and energy. By analyzing morphological, biophysical, biochemical characteristics followed by the analysis of 16s rRNA phylogenetic studies, the strain was identified as Brevibacillus brevis (T2). The mechanism of biodegradation and its characterization at different environmental parameters as pH, temperature, salinity influencing the degradation process in contaminated soil have also been examined. The results of this study showed the optimal pH value ranges 7.0 optimal temperature ranges 37˚while salinity could tolerate up to 15% which influenced the degradation rate in soil. We also investigated the effect of various carbon sources, nitrogen sources and different DEHP concentrations on its degradation. We hope that these findings can provide some information in the bioremediation of DEHP from contaminated soil.

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FEATURED TALKS

Title: Diving into the Depths: Exploring Underwater Electronic Sensor Technology

Speaker Name: Pooja Prasenan

Affiliation: Cochin University of Science and Technology

Abstract:

Sensors are used to perceive events or parameters in the environment where it is kept. Underwater electronic sensors play a crucial role in collecting various types of data for scientific research, environmental monitoring, industrial applications, and defense purposes. These sensors are designed to operate in challenging underwater environments, where factors such as pressure, temperature, and corrosion resistance must be carefully considered. The common types of underwater electronic sensors includes pressure sensors, temperature sensors, salinity sensors, sonar system, Acoustic Doppler Current Profilers (ADCP), pH sensors, optical sensors, magnetic sensors, underwater cameras, gas sensors, hydrophones, CTD sensors etc. As marine water pollution is increasingly affecting the water bodies especially oceans it becomes important to monitor the causes influencing pollution. Most water bodies are significantly polluted, thus decreasing the potability of water. Due to increase in population, industrialization and urbanization, large quantities of sewage and industrial waste water are discharged into water bodies which has considerably contributed to the marine pollution. Water quality assessment has to be conducted, from time to time, to implement pollution control measures to rejuvenate the marine water quality. Water quality monitoring relies on taking a suite of measurements of ocean water. In order to measure water quality, ocean scientists use sampling equipment that measures some basic parameters of the water. The equipment's (underwater sensors) may consist of a moored instrument that takes water quality measurements continuously. These instruments can also be lowered from the surface to the bottom of the ocean limited to few meters. Some of the typical measurements which can be made with underwater sensors include temperature, salinity, density, transparency, water current and its direction, Sea Surface Temperature etc. Studies estimates that, up to 75% of the world population have settled within a sixty-kilometre distance from the shoreline by 2020, which will most likely lead to increase more anthropogenic pressures on coastal systems and to more serious environmental issues. Anthropogenic activities including industries, urbanization, extensive agriculture, tourism etc represent the major sources of pollutants which continually contribute to exacerbate the already serious situation of coastal systems. Therefore, underwater sensors plays an important role for monitoring of marine water parameters. Key research should be instituted on evaluating real-time monitoring of marine parameters and real-time processing of huge amounts of information generated. It will improve the comprehensive utilization of marine resources and marine pollution warnings, as well as marine ecological and environmental protection capabilities.

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FEATURED TALKS

Title: **Effective Anomaly Detection Approach to Classify Noisy Data Using Robust Noise Detection and Removal Technique in IoT Healthcare Data**

Speaker Name: S. Subha

Affiliation: Bishop Heber College

Abstract:

In IoT, it is a collection of connected devices or sensors that allows data to be collected and shared over the internet. Sensor data quality is critical in IoT applications since they become unusable if the information is substandard. When the IoT sensors' data seems to be of bad quality, the analysis findings should be altered, resulting in smart service misdirection. Anomalies or aberrant behavior the data that these devices acquire may be affected via attacking problems or system failures. Cleaning One of the most vital and necessary processes is dealing with noisy sensor data for accurate data interpretation. This paper proposes an effective anomaly detection approach to classify noisy data using robust noise detection and removal technique called RoNDaR. There are two phases in the proposed approach. In the initial stage, the archived data (labeled) is initially clustered using the modified weight- based Self Organizing Map clustering algorithm called MWSOM. In the next phase, the noise score is computed, and based on the nearest neighbors the noise data is detected. Three classification algorithms (K-nearest Neighbor) KNN, RF (Random Forest) and SVM are used to evaluate the performance of the data on noise detection. The real-time data is used to assess the performance of the proposed method. The experimental results show that the proposed approach increases the classification accuracy after removing the noise data.

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FEATURED TALKS

Title: Study of the Role of Titanium and Iron Cathodic Cages on Plasma-Nitrided AISI 430 Ferritic Stainless Steel

Speaker Name: Mirza Muhammad Zaheer Uddin Babar

Affiliation: Riphah International University

Abstract:

In contrast to austenitic and martensitic stainless steels, ferritic stainless steels have a lower hardness and wear resistance but exhibit excellent corrosion resistance. Due to this fact, their use in the aerospace, automobile, and house construction industries is restricted. Several methods have been utilized to enhance the tribological characteristics of ferritic stainless steels. In this work, titanium nitride coating has been carried out by using a cathodic cage of titanium material, and later on, the titanium cathodic cage is replaced by an AISI-304 cathodic cage in a CCPN chamber to form iron nitride coating on AISI-430 ferritic stainless steel coupons through a plasma nitriding process for 4 h at a fixed temperature of 400 ◦C. The microstructures and mechanical traits of all processed and control coupons were analyzed using scanning electron microscopy, X-ray diffraction, ball-on-disc wear tester, and microhardness tester techniques. The results showed that hardness increased up to 1489 HV with the titanium cage, which is much higher than the hardness of the base material (270 HV). The titanium cage-treated coupons have high layer thickness, smooth surface morphology, and a minimum crystallite size of 2.2 nm. The wear rate was reduced up to 50% over the base material after the titanium cage plasma treatment. The base coupon exhibited severe abrasive wear, whereas nitrided coupons exhibited dominant adhesive wear. In the iron nitride coatings, this effect is also important, owing to the more influential cleaning process in a glow discharge, and the better adhesion with enhanced interlayer thickness is attributed to the fact that the compliance of the interlayer minimizes shear stresses at the coating–substrate interface. The use of a graded interface improves adhesion compared with the case where no interlayer is used but a titanium interlayer of comparable thickness provides a significant increase in measured adhesion. For both titanium and iron nitride films, there is a reduction in wear volume which is a function of interlayer thickness; this will have a substantial effect on wear lifetime. Thus by careful control of the interlayer thickness and composition, it should be possible to improve coating performance in tribological applications.

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FEATURED TALKS

Title: **Raft forming gastro retentive tablets incorporating solidly dispersed Curcumin-Eudragit E100; In-vitro and in-vivo approaches for treatment of gastric ulcer**

Speaker Name: Nabeela Ameer

Affiliation: Bahauddin Zakariya University Multan

Abstract:

Purpose: Most common complications of the gastric ulcer are hemorrhage, perforation, ulcer penetration into adjacent organs, and gastric outlet obstruction which can be fatal if untreated. The present study aimed to improve gastric ulcer complications by using naturally occurring compound curcumin (Cur) and its modified complex with Eudragit E-100 (SD-Cur-Eud2).

Method: Solubility of Cur was enhanced by using first-generation solid dispersion (SD) technique and confirmed by physicochemical analysis. Optimized SD-Cur-Eud2 was used for the compression of gastroretentive raft tablets (SD-Cur-Eud2-RT) by direct compression method and all quality control tests, in-vitro floating time, raft resilience, in-vitro dissolution studies, and dissolution efficiency were also observed. Stability studies was performed to estimate shelf life by using Rgui software.

Results: All the confirmatory tests of SD-Cur-Eud2-RT were found within limits according to Pharmacopeial standards. 60-70% release of Cur within 6h in acidic medium (pH = 1.2), 40-65% permeation on rat gastric mucosa, and 68% ulcer inhibition in Indomethacin® (IND) induced gastric ulcer. Furthermore, cumulative amount of diffused (CADD), flux (Jss) and permeability coefficient (Kp) of Cur were 6-10-fold increased with shelf life of 23 months. Fortunately, SD-Cur-Eud2-RT (50mg/kg once daily) tablets exhibited showed better therapeutic effect on gastric ulcers in terms of ulcer index 2.5±0.2 as compared to Omeprazole®.

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FEATURED TALKS

Title: **Enhancing Dielectric Strength of Polyester Insulation in Ignition Coils using Nano and Micro Fillers: A Comparative Study of Al_2O_3 and ZnO**

Speaker Name: Sara Islam

Affiliation: University of Engineering and Technology

Abstract:

This study primarily investigates the challenges related to polyester insulation in ignition coils and explores the potential of utilizing nano and micro fillers, specifically ZnO and Al2O3, to tackle these issues. The research focuses on examining the dielectric strength of these fillers and observes that with an increase in filler concentration, certain properties are influenced by environmental temperature and humidity variations. Notably, ZnO-filled composites exhibit enhanced interfacial polarization, but a decrease in dielectric strength due to moisture absorption and elevated temperatures. Conversely, Al2O3 filled specimens demonstrate improved dielectric strength. The estimation of the relationship between relative humidity (RH), temperature, and dielectric strength can be achieved through the utilization of a mathematical model based on the finite element method (FEM).

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FEATURED TALKS

Title: Enhanced Structural and Dielectric Properties of InMn substituted M-type Hexaferrites

Speaker Name: Hassan Mehmood Khan

Affiliation: The Islamia University

Abstract:

Effect of rare earth and Divalent (InMn) substitution on the structural electrical and dielectric properties of W-type hexaferrites prepared by sol–gel auto combustion is reported. The synthesized samples were characterized by Fourier transform infrared spectroscopy, X-ray diffraction, scanning electron microscopy electrical and dielectric properties (resistivity and conductivity). The X-ray diffraction analysis confirmed single phase M-type hexa-ferrite structure. The lattice parameters were found to increase as In Mn contents increases, which is attributed to the ionic sizes of the implicated cations. The InMn seems to be completely soluble in the lattice. The results of scanning electron microscopy shows that the grain size decreases with increase of In Mn substitution. The increased anisotropy and fine particle size are useful for many applications, such as improving signal noise ratio of recording devices.

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FEATURED TALKS

Title: **Electrospun PVA/CuONPs/Bitter Gourd Nanofibers with Improved Cytocompatibility and Antibacterial Properties: Application as Antibacterial Wound Dressing**

Speaker Name: Aiman Shahbaz

Affiliation: The University Of Lahore

Abstract:

Antibacterial and cyto-compatible tricomponent composite electrospun nanofibers comprised of polyvinyl alcohol (PVA), copper II oxide nanoparticles (CuONPs), and Momordica charantia (bitter gourd, MC) extract were examined for their potential application as an effective wound dressing. Metallic nanoparticles have a wide range of applications in biomedical engineering because of their excellent antibacterial properties; however, metallic NPs have some toxic effects as well. The green synthesis of nanoparticles is undergoing development with the goal of avoiding toxicity. The aim of adding Momordica charantia extract was to reduce the toxic effects of copper oxide nanoparticles as well as to impart antioxidant properties to electrospun nanofibers. Weight ratios of PVA and MC extract were kept constant while the concentration of copper oxide was optimized to obtain good antibacterial properties with reduced toxicity. Samples were characterized for their morphological properties, chemical interactions, crystalline structures, elemental analyses, antibacterial activity, cell adhesion, and toxicity. All samples were found to have uniform morphology without any bead formation, while an increase in diameters was observed as the CuO concentration was increased in nanofibers. All samples exhibited antibacterial properties; however, the sample with CuO concentration of 0.6% exhibited better antibacterial activity. It was also observed that nanofibrous mats exhibited excellent cytocompatibility with fibroblast (NIH3T3) cells. The mechanical properties of nanofibers were slightly improved due to the addition of nanoparticles. By considering the excellent results of nanofibrous mats, they can therefore be recommended for wound dressing applications.

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FEATURED TALKS

Title: Integration of Biosensors and Bioelectronics for Advanced Point-of-Care Monitoring in Chronic Kidney Disease (CKD)"

Speaker Name: Muhammad Subhan

Affiliation: Allama Iqbal Medical College

Abstract:

Chronic Kidney Disease (CKD) is a prevalent and debilitating health condition characterized by the gradual loss of kidney function, necessitating consistent monitoring for effective management. Early detection and continuous monitoring of CKD progression are paramount for timely intervention and improved patient outcomes. This study proposes the integration of biosensors and bioelectronics for advanced point-of-care monitoring, offering a promising solution to address the critical need for real-time, non-invasive assessment in CKD patients.

Biosensors, with their biorecognition elements and transducers, provide a means to detect specific biomarkers associated with CKD progression. Incorporating bioelectronics, encompassing signal processing, amplification, and data analysis, enhances the accuracy and reliability of biosensor outputs. This integration facilitates the creation of portable, user-friendly devices for convenient point-of-care monitoring.

The utilization of biosensor-bioelectronics hybrids holds the potential to measure crucial CKD biomarkers, such as creatinine, blood urea nitrogen, and electrolyte levels, directly from a small volume of patient samples (e.g., blood, urine). The real-time data obtained enables proactive management, precise dosage adjustments, and timely medical interventions, optimizing the overall management of CKD.

In conclusion, this research advocates for the synergistic integration of biosensors and bioelectronics, presenting an innovative and promising avenue for enhanced point-of-care monitoring in CKD. Such technological advancements offer transformative opportunities to improve patient outcomes, potentially revolutionizing the management of CKD and advancing healthcare practices.

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FEATURED TALKS

Title: The ameliorative effects of topical gemifloxacin alone or in Combination with clobetasol propionate on imiquimod-induced model of psoriasis in mice

Speaker Name: Hayder Ridha Salman

Affiliation: Al- Mustaqbal University

Abstract:

Psoriasis is a lifelong immune-driven skin condition characterized by excessive epidermal overgrowth and inflammatory cell infiltration. Gemifloxacin is a fourth-generation fluoroquinolone with improved immunomodulatory and anti-inflammatory properties that are believed to possess an attractive role in psoriasis via suppressing the production of cytokines, chemokines, and eosinophil and neutrophil chemotaxis. The aim of this research is to investigate the ameliorative effects of prolonged topical gemifloxacin (GMF) alone and combined with clobetasol propionate (CLO) on an imiquimod (IMQ)-induced mouse model of psoriasis. Forty-eight Swiss albino mice were divided into six groups of eight. All groups except the negative controls got

62.5 mg of IMQ 5% topically for 8 days. Mice in the control group (controls) got Vaseline instead. Following the induction in the IMQ 5% group, mice in treatment groups CLO 0.05, GMF 1%, GMF 3%, and CLO + GMF obtained clobetasol propionate 0.05%, GMF 1% and 3%, and a combination of both, respectively, for an additional 8 days, rendering the experiment 16 days long. Our results revealed that gemifloxacin alleviated erythematous, thickened, and scaly psoriatic lesions and inhibited the tissue level of inflammatory cytokines, including interleukin (IL)-8, IL-17A, IL-23, tumor necrosis factor-α (TNF-α), and transforming growth factor-β1 (TGF-β1). The anti- inflammatory effect also occurred by hindering nuclear factor-kappa B (NF-κB) signaling and reversing histopathological problems. Gemifloxacin acts effectively in mitigating psoriasis- associated lesions and restricting NF-κB-mediated inflammation, recommending gemifloxacin as a promising adjuvant candidate for additional studies on the long-term treatment of autoimmune and autoinflammatory dermatoses like psoriasis.

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FUTURE OF BIOSENSORS AND BIOELECTRONICS
JUNE 20-21, 2024 | BARCELONA, SPAIN

FEATURED TALKS

Title: Sealing ability in vitro study and biocompatibility in vivo animal study of different bioceramic based sealers

Speaker Name: Tara Hasan Haji

Affiliation: Kurdistan Board for Medical Specialist

Abstract:

Introduction: The effectiveness of root canal therapy in endodontic practice is largely determined by achieving a compact fluid-tight closure at the apical end of the root canal, which inhibits irritant entry and buildup, which leads to a biological breakdown of the attachment mechanism and failure. During obturation, root canal sealers are used in conjunction with gutta percha to fill voids and seal root canals. Root canal sealers come in a variety of shapes and sizes, each with its own set.

Aim: Biocompatibility was tested on animal models, and sealing ability was assessed using Scanning Electronic Microscope.

Materials &methods: This study utilised two bio_ ceramic sealers (BioRoot RCS and meta Biomed bio_ ceramic sealer (CeraSeal RCS) and compared the findings to a control of Zinc oxide eugenol sealer. Biocompatibility was determined by examining histopatholigcal biopsy specimens collected from rabbits. Each rabbit had four dentin tubes implanted into the subcutaneous tissues, one for BioRoot RCS, one for CeraSeal RCS, and one for ZOE RCS, with the fourth tube being empty. Histological sections were stained with haematoxylin and eosin and assessed with light microscope. Extracted human single canal premolars were used to test the sealing ability. The root canals were divided into 3 sections (coronal, middle, and apical). SEM was used to assess the adhesion quality at the sealer-dentin interface.

Results: BioRoot and CeraSeal sealers have excellent sealing adaptation and biocompatibility, as well as rapid tissue recovery, while ZOE sealers have a slower recovery of inflammatory reaction results when compared to bio_ root and ceraseal sealers, as well as less sealing adaptation than the two other bio_ ceramic sealers.

Conclusion: In general, all sealers tested were biocompatible and capable of sealing or adhesion.

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JUNE 20-21, 2024 | BARCELONA, SPAIN

FEATURED TALKS

Title: Fabrication of Novel Graphene oxide Electrodes for Electrochemical Applications

Speaker Name: Haleemat Iyabode Adegoke

Affiliation: University of Ilorin

Abstract:

The preparation, characterization and electrochemical performance of graphene oxide (GO) and reduced graphene oxide (rGO) based materials have been reported. The synthesis of GO was achieved through the modified Hummers' method. The rGO was obtained by thermal exfoliation and synthesized Polyaniline (PANI) was doped on rGO to obtain a novel nanocomposite, GO-PANI, through the chemical polymerization of aniline monomer.

The GO and GO-PANI, were characterized using Fourier Transform Infrared spectroscopy (FT-IR), Scanning Electron Microscopy (SEM) and Energy Dispersive X-ray (EDX). These analyses provided insights into the structural properties and elemental composition of the materials, cyclic voltammetry (CV) was also conducted.

The electrochemical behavior of modified glassy carbon electrodes (GCE), including GCE/RGO and GCE/RGO/PANI demonstrated enhanced electron transfer kinetics as evident from redox peak shifts to lower voltages and increased peak currents compared to the bare GCE. Specifically, for the bare GCE, the anodic and cathodic peak potential are 0.2774 V and 0.09535 V, while anodic and cathodic peak current are 3.8407E-05 A/cm² and 4.2695E-05 A/cm². The GCE/RGO and GCE/RGO/PANI electrodes showed anodic peak potential of 0.37628 V and 0.39733 V with their respective cathodic peak potential of -0.0066032 V and -0.39762 V.

These findings suggest the promising potential of rGO and PANI modifications for improving the electrochemical performance of GCE and pave the way for their application in various environmental pollutants sensing.

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JUNE 20-21, 2024 | BARCELONA, SPAIN

FEATURED TALKS

Title: Geomagnetic Field Anomalies Associated With Natural And Man-Made Phenomena

Speaker Name: Valijon Yusupov

Affiliation: Seismology Institute of Sciences Academy of the Republic of Uzbekistan

Abstract:

In the article, "Anomalies of the geomagnetic field on micro-polygon Charvak associated with earthquakes" details the analysis of long-term observations of the geomagnetic field on the territory of the Charvak reservoir is conducted. Which revealed, that local anomalies geomagnetic field connected with a simultaneous and total manifestation of the processes, in accordance with change the volume of the water reservoir and change to activities local seismicity, considered questions of the use these result at forecasting of the earthquakes.

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FEATURED TALKS

Title: **Decoherence and Relaxation Time of Magnetopolaron in the Presence of Three Dimensional Impurity Under Strong Parabolic Potential**

Speaker Name: Donfack Bernard

Affiliation: University of Dschang

Abstract:

In order to protect coherence of quantum states and reduce the impact of environment on quantum information, we investigate decoherence and relaxation time of magnetopolaron in the presence of three dimensional impurity under strong parabolic potential. The first states energies have been evaluated using the Lee Low Pine transformation and Pekar-type variational method. Parameters such as: decoherence time, transition frequency, spontaneous emission, Shannon entropy, relaxation time and probability density, have been evaluated. It has been seen that the impurity and electron-phonon coupling constant have a considerable effect on formation, protection of quantum qubit and quantum transport. The information exchange measured by the rate of Shannon entropy, has a great dependence on impurity and with its interaction with electrons. The relaxation time τr exhibits increasing behavior as a function of, α, β, and ωc. The electron-phonon coupling constant, impurity and cyclotron frequency are useful parameters to prevent decoherence phenomena. This study paves the way to prolong quantum effect in nanostructure and favor the realization of the future quantum computer.

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FEATURED TALKS

Title: Computational model and simulations of contact angle and geometry effects on centrifugal microfluidic step-emulsification

Speaker Name: Maximilian Fahland

Affiliation: Dublin City University

Abstract:

The generation of droplets in microfuidic systems is extensively applied in various chemical and biological applications. For two-phase immiscible micro-droplet formation, both actively and passively driven systems are being employed. Active systems typically include pump-based, magnetic actuation or centrifugal fow control-based methods that employ cross fowing, fow- focusing or co-fowing microfuidic architecture to assist formation. Numerical modeling using Computational Fluid Dynamics (CFD) allows for an in-silico approach in the understanding of the micro-droplet formation behavior and the efect of several parameters on the size and rate of droplet formation. Although several such models have been presented pre viously for pump-driven cross- fowing, fow focusing or co-fowing microfuidic architectures, systems typically employing centrifugal actuation methods are limited. We investigate here a CFD method for modeling and simulating step- emulsifcation of water-in-oil, on a centrifugal microfuidics platform. The efects of contact angles, supply channel geometry, and capillary number were studied using the numerical model and compared to experimental data from previous work.

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FEATURED TALKS

Title: High conducting Biopolymer electrolyte based electrochemical devices

Speaker Name: Pramod Kumar Singh

Affiliation: Sharda University

Abstract:

This paper deals the overall response of mixing ionic liquid into biopolymer matrix. Ionic liquid is frequently used as novel electrolyte in various electrochemical devices. For device application high conducting biopolymer electrolyte is necessary which can easily be provided by this ionic liquid when used as dopants. Mixing ionic liquid into biopolymers plays dual role. One side it plays as source of charge carriers while in other side it acts as plasticizer when incorporated in polymer matrix. It is also necessary to understand detail conduction mechanism within ionic liquid incorporated polymer electrolyte. Possible reasons of conductivity enhancement are discussed in detail in present work.

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FEATURED TALKS

Title: Safety and health risks associated with illegal municipal solid waste disposal in urban Zimbabwe. "A case of Masvingo City"

Speaker Name: Amato Chireshe

Affiliation: Midlands State University

Abstract:

Municipal solid waste management (MSWM) is a worldwide problem as most local authorities are unable to dispose Municipal solid waste (MSW) safely. The study sought to evaluate safety and health risks associated with illegal MSW disposal in Masvingo City. Descriptive cross-sectional design was employed in which quantitative and qualitative data were collected concurrently. Questionnaires with both close and open-ended questions, semi-structured interviews, observations and secondary data sources were used during data collection. The study population comprised participants from Masvingo City's residential areas, Masvingo City Council employees and Environmental Management Agency (EMA) officials. A sample of 406 participants, comprising 354 residents from high-density, 16 residents from medium-density, 24 residents from low-density suburbs. Six interviewees were included during the study. Interviewees were selected purposively. Quantitative data was entered into Microsoft Excel Spreadsheet for analysis and content analysis was used to analyse qualitative data. Results showed that Cholera, skin problems, injuries and malaria were the main health problems. Results also indicated that flooding and fire were the main safety risks associated with illegal municipal solid waste disposal in Masvingo. Based on the findings of the study, it can be concluded that MSW disposal in Masvingo was a threat to safety and human health. The study recommends that Masvingo City council provide receptacles and collect waste frequently.

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FEATURED TALKS

Title: Real-time transient stability detection in the power system with high penetration of DFIG-based wind farms using transient energy function

Speaker Name: Hamid Reza Shabani

Affiliation: Iran University Of Science and Technology

Abstract:

In this paper, a new approach for real-time transient instability detection (TID) is presented. The purpose of presenting this approach is to have the lowest computational load and the highest accuracy and speed and to be suitable for real-time applications. The main idea is TID without directly calculating the unstable equilibrium point (UEP). In fact, transient instability is detected only by identifying the characteristics of the UEP and the kinetic energy function along with the potential energy boundary surface (PEBS) function. A new and standard single machine in nite bus system with high penetration of wind farms is used for simulation. First, dynamic modeling of various components of doubly fed induction generator (DFIG) and synchronous generator are described. Then, a model for the grid-connected DFIG is developed and a new PEBS-based index (NPI) for TID is presented. The NPI requires only post-fault data and can be applied as a general tool to any power system with any change in topology and operating conditions. Also, the impact of increasing the penetration of wind power, changing the operating conditions of the power system, different fault locations, and the power system strength on the transient stability is investigated. The simulation results show the effectiveness of the proposed approach for TID in a shorter time.

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FEATURED TALKS

Title: Naïve Bayes: A Classical Approach for the Epileptic Seizures Recognition

Speaker Name: Surita Maini

Affiliation: SLIET

Abstract:

Electroencephalography (EEG) is used to classify several Epileptic Seizures worldwide. It is a very crucial task for the neurologist to identify the epileptic seizure with manual EEG analysis, as it takes lots of effort and time.
Human error is always at high risk in EEG, as acquiring signals need manual intervention. Disease diagnosis using Machine Learning (ML) is continuously being explored since its inception. Moreover, where a large number of datasets have to be analyzed, ML is acting as a boon for doctors. In this research paper, authors proposed two different ML models i.e., Logistic Regression (LR) and Naïve Bayes (NB) to predict epileptic seizures based on general parameters. These two techniques are applied to the epileptic seizures' recognition dataset, available on the UCI ML repository. The algorithms are implemented on an 80:20 train test ratio (80% for training and 20% for testing) and the performance of the model was validated by 10-Fold cross-validation.
The proposed study has claimed accuracy of 81.87%, and 95.49% for LR and NB, respectively.

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FEATURED TALKS

Title: **Biochemical and Biocompatibility assessment of Everolimus eluting vs Sirolimus eluting stents in Coronary artery aneurysms with a possible role of Methacrylate as inciting agent**

Speaker Name: Aditya Vikram Ruia

Affiliation: Meditrina Hospital

Abstract:

Background: Coronary artery aneurysms are rare, found in 0.2 to 2.3% of patients after coronary angioplasty. Cases have been reported to occur varying from 3 days to 4 years post percutaneous intervention (PCI). Here we present a case series of coronary aneurysms related to Everolimus eluting second generation stents and compare it with Sirolimus eluting second generation stents at our Centre including patients developing giant aneurysms with a toxic course.

Case Presentation: Over a span of 3.5 years at our centre 2,572 patients were implanted Everolimus eluting stents out of which 4 patients developed coronary type II aneurysms an incidence of 0.00156 whereas 5,838 patients were implanted Sirolimus eluting 2nd generation stents out of which 2 patients developed similar aneurysms with an incidence of 0.00034. The slight increase in incidence in Everolimus stents does not reach statistical significance (p=0.054) and is limited by single centre non randomized study. We also propose a hypothesis that the slight increase in the incidence maybe due to allergy to Methacrylate present in Everolimus eluting Xience stent's primer previously known to cause allergy in Cypher stents which is absent in other Sirolimus eluting stents used but that needs to be further investigated.We also found some patients developed giant aneurysms including Left main aneurysms with a toxic course.

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FEATURED TALKS

Title: Statistical analysis of a wide range of foxtail millet (Setaria italica L) germplasms of based on yield and some agronomic traits

Speaker Name: Mehdi Yazdizadeh

Affiliation: University of Zabol

Abstract:

Food security and nutrition concerns are putting an ancient, climate-smart grain back on our plates; Farm to fork, there has been a revival of interest in millet. Foxtail millet, as a multi-purpose product, has nutritious and medicinal potentials. According to the phenotypic correlation coefficient, the seed yield had the highest correlation between forage and biological yield as well as the number of leaves under normal conditions. Similarly, seed yield was most correlated with biological, forage yield, plant height, and the number of leaves as well as the seed germination percentage under salinity stress. By breaking down the properties studied under normal conditions into principal component analysis, we found that the first four principal components accounted for more than 77.91% of the total variance, and similarly, we discover that the first three principal components accounted for more than 92.35% of the total variance under salinity conditions. The dendrogram obtained by cluster analysis revealed four groups of genotypes under both normal and salt conditions. Analysis of phenotypic data showed that the wide germplasm of the Iranian foxtail millet has a significant variation with respect to the measured properties.

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FEATURED TALKS

Title: Effects of edible alginate coating enriched with organic acids on quality of mango fruit during storage

Speaker Name: Rasoul Etemadipoor

Affiliation: University of Hormozgan

Abstract:

Application of edible coatings containing organic acids is an effective method to preserve the quality and improve the storability of fresh product. For this purpose, 2% sodium alginate (Al) alone as well as in combination with 1% citric acid (CA), malic acid (MA) and ascorbic acid (AsA) was used on 'Langra' mango. The samples were stored at 10 ± 1 °C and 90 ± 1% relative humidity for 32 days. The results indicated that all the Al-treated fruit maintained the quality of mango fruit. Al/AsA treatment was showed the lowest chilling injury whit ~ 54% difference compared to the control. Moreover, the minimum weight loss (4.18%) was observed in the Al/AsA treated fruit and the lowest firmness (3.61 N) was obtained in the control fruit while there were no significant difference between other treatments. Al/AsA treatment was showed the maximum content of AsA (18.29 $mg100g^{-1}$ FW), total phenol (175.36 $mgGAE100g^{-1}$ FW), flavonoid (40.94 mg quercetin 100 g^{-1} FW) and antioxidant activity (34.43%) at the end of storage while the highest level of the soluble solids content and the lowest level of titratable acidity were obtained in the control. Overall, these findings showed that the Al edible coating treatment by incorporation of' organic acids, especially with AsA, can be useful for preserving the quality of stored mango fruit.

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JUNE 20-21, 2024 | BARCELONA, SPAIN

FEATURED TALKS

Title: Innovations in Safeguarding Food Supply: A Comprehensive Analysis of Biosensors and AI Integration for Enhanced Quality and Safety

Speaker Name: Bahareh Rezazadeh

Affiliation: Science and Research Branch of Islamic Azad University

Abstract:

In a time dominated by automation, Artificial Intelligence (AI), and the widespread use of the Internet of Things (IoT) and biosensors, we explore how blending AI and biosensors in the food industry can significantly enhance food quality and safety.

The primary objective of this study is to investigate the synergistic impact of integrating AI and biosensors within the context of the food industry, specifically focusing on how this integration can substantially elevate both food quality and safety. The study aims to provide a comprehensive understanding of the diverse applications of biosensors across the entire food supply chain.

The scope of the study encompasses an in-depth breakdown of how biosensors are deployed to regulate food health. This includes managing raw materials, their progression through factories, processing stages, quality control measures, packaging processes, and distribution to retailers. The study proposes a taxonomy to categorize and elucidate the varied applications of biosensors, ensuring a holistic perspective on their role in maintaining consistent food safety and quality throughout the supply chain.

The methodology used in this study is the Systematic Literature Review (SLR), which involves an extensive review and comparison of recent papers in international journals. The analysis includes assessing main ideas, novel findings, applied techniques, weaknesses, and strengths. A taxonomy is introduced to classify biosensor applications in the food industry and used to create a comprehensive comparison table and identify gaps in existing research. Advanced techniques for ensuring food quality and safety are explored by investigating the latest biosensor technologies.

The study draws on a review of recent papers from reputable international journals, analyzing their main ideas, novel findings, applied techniques, weaknesses, and strengths. A comprehensive comparison table addresses gaps in previous research and showcases how the study fills these deficiencies. Additionally, a classification of references based on biosensor applications is presented through the proposed taxonomy. The investigation identifies advanced techniques and practical methods derived from the latest biosensor technologies, offering a pathway for transforming how food safety is monitored and ensured.

This paper concludes by addressing the challenges inherent in the interdisciplinary field, highlighting open issues for further exploration. A detailed roadmap is provided for future endeavors, guiding researchers, industry practitioners, and policymakers. The study positions itself as a beneficial resource that surpasses conventional studies, offering insights into the dynamic intersection of biosensors and the food industry. By advocating for a future where innovation and industry success are intertwined, the study signifies a notable shift in the pivotal role biosensors play in guaranteeing the safety and quality of the global food supply.

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FEATURED TALKS

Title: Oscillatory thermal process in gas-bearing coal that occurs during desorption methane induction in a sealed volume

Speaker Name: Vyacheslav Alexandrovich Bobin

Affiliation: N.V. Melnikov of the Russian Academy of Sciences, Russia

Abstract:

The report presents the results of mine and laboratory studies of the phenomenon of adsorption methane induction in sealed volumes (respectively, in a sealed well formed in the formation by drilling through a rock plug, and a thermobaric flask) filled with gas-bearing coal, as well as the oscillatory thermal process in this coal that occurs during this.

A physical model of the process occurring in the objects of research has been created, and and its mathematical description is obtained.

At the same time, the phenomenon of desorption methane induction was revealed as a result of mutually opposite processes, namely desorption from fine coal or from coal located in the reservoir in the zone of influence of the well, which forms the pressure of methane in the free space of objects, which, with an increase in its value, promotes the reverse sorption of the released methane into coal and, thus, slows down desorption from it, which caused its appearance, which ultimately reduces it to zero.

The formula mathematically describing the phenomenon of desorption methane induction shows that its quantitative induction characteristics are determined by the natural gas saturation of coal and the rate of methane release from it. Coal itself, in the process of desorption induction, experiences a continuous change in the temperature of the damped oscillatory harecter in each of its layers, which is associated with both methane desorption and heat exchange between coal layers having different granulometric composition and different macrostructure of granules.

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FEATURED TALKS

Title: Modification of Flexible Electrodes for P-Type (Nickel Oxide) Dye- Sensitized Solar Cell Performance Based on the Cellulose Nanofiber Film

Speaker Name: Habtamu Fekadu Etefa

Affiliation: Walter Sisulu University

Abstract:

The preparation of flexible electrode, including working electrode (WE) and counter electrode (CE), for dye-sensitized solar cells (DSSCs) utilizing metal oxides using environmentally friendly sustainable TEMPO-oxidized cellulose nanofibers (TOCNFs) is reported in this work. A new type of flexible electrode for the DSSCs, which were made of cellulose nanofiber composites with nickel hydroxide [CNF/$Ni(OH)_2$] substrate films and cellulose nanofiber composites with polypyrrole (CNF/PPY). Nickel hydroxide, Ni(OH)2, has been prepared hydrothermally in the presence of TOCNFs, [TOCNF@$Ni(OH)_2$]. Similarly, the conductive polymer substrate has also been prepared from a composite consisting of TOCNF and PPY, TOCNF@ PPY film, by means of polymerization for the CE. Overall, the prepared electrodes both WE from CNF/$Ni(OH)_2$ substrates and CE from the TOCNF@PPY substrate film were revealed as the novelty of this work and which no one has introduced previously. Although NiO nanoparticles (NPs) coated on the Ni $(OH)_2$/TOCNF electrode also produced a good power conversion efficiency, PCE (0.75%); nevertheless, the NiO NP treatment with carbon dots boosted the efficiency up to 1.3%.

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FEATURED TALKS

Title: A Hybrid Nano Material Based Highly Sensitive Surface Plasmon Resonance Biosensor for Waterborne Bacteria Detection

Speaker Name: Quazi D.M. Khosru

Affiliation: University of Engineering and Technology

Abstract:

Developing low-cost sensors for the detection of bacteria causing dangerous waterborne diseases like cholera and typhoid is a worldwide problem. In view of the unfortunate reality that clean and safe drinking water, free in particular from waterborne bacteria, is not generally accessible. Infections spread by water can be caused by a wide variety of bacteria, including common ones like Vibrio cholera, Serratia marcescens, Escherichia coli, and Micrococcus lysodeikticus. Several methods have been described over the past decade, but optical methodology stands out as a robust, low-cost, and dependable approach to biological sensing. In this work, a new SPR biosensor is proposed based on a BaTiO3-BlueP/WS2 hybrid structure, using a CaF2 prism coupled to a ZnO adhesion layer, which is connected with an Ag plasmonic layer. A protective affinity layer is deposited on top of the BlueP/WS2 hybrid nanomaterials to improve the detection of waterborne bacteria. For each potential bacterial detection, different types of affinity layers are considered. Each of the four types of waterborne bacteria is attracted to their respective affinity layers. Several performance parameters are evaluated and compared with the variation of the sensing medium to identify those specific bacteria. The optimal thickness of the proposed structure is decided by attenuated total reflection technique and analysis performance parameters by using angular interrogation technique, which is simulated by using the transfer matrix method and finite- difference time-domain analysis. The proposed sensor demonstrated a very high sensitivity of 333.59 to 345.56 deg/RIU, quality factor 120.65 to 123.11 (1/RIU) with higher figure of merit from 119.2 to 121.92 respectively. The biosensor also achieved very high detection accuracy 1.206 to 1.231 with a higher limit of detection of 2.894×10-6 to 2.998×10-6. These results indicate a balanced sensing performance for all four types of waterborne bacteria detection.

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FEATURED TALKS

Title: Selective and Simple Determination of Isoquinoline Alkaloids in Papaver Species by Ion Mobility Spectrometry

Speaker Name: Seied Vahid Ghasemi

Affiliation: Institute of Medicinal Plants

Abstract:

In this study, a fast and precise method for determining three opium alkaloids (morphine, codeine, and thebaine) in different parts of some Papaver species was developed and validated with a low limit of detection (LOD) of 0.05 - 0.20 mg/L. The proposed method was based on three extraction steps by alkaline aqueous solution/chloroform/acidic aqueous solution and analysis by ion mobility spectrometry (IMS) and high-performance liquid chromatography (HPLC). After optimizing IMS parameters based on an experimental design, IMS was applied to analyze the extracts of seeds, stems, leaves, and capsules of seven Papaver species collected from different regions of Iran. All prepared samples were analyzed by HPLC and IMS at the same time. Then, the obtained results of the two instrumental methods were compared. The HPLC did not detect morphine in the prepared samples, while IMS results showed trace amounts of morphine in the capsules and leaves of four Papaver species. Other results were comparable and showed that IMS is more sensitive, affordable, and faster than HPLC for alkaloid analysis.

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FEATURED TALKS

Title: Corrosion, mechanical and bioactivity of HA – CNT, HA- GE composite coatings on anodized Ti6al4V and AZ31 Mg alloy

Speaker Name: Mohsen Saremi

Affiliation: University of Tehran

Abstract:

The use of body implants has increased rapidly due to the aging, diseases and incidents. Titanium and its alloys are often used as permanent implants for their stable chemical properties, bioactivity and mechanical properties. Mg alloys are also considered as temporaryimplants because of their bioactivity and biodegradability. However a percentage of implants need to be renovated because of their undesirable properties and infection. An efficient strategy is to modify the surface of the implant by roughening, porosity or apply surface coating.

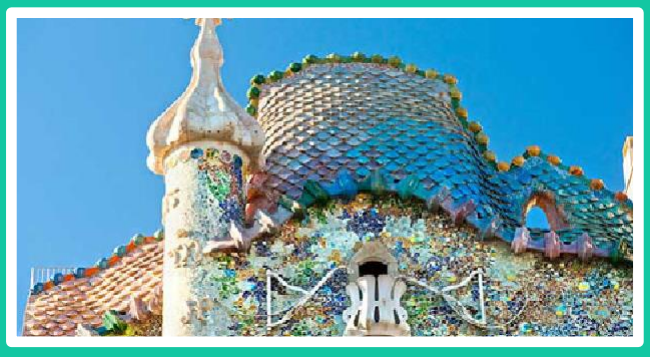
Hydroxy Apatite (HA), is a biocompatible compound, with composition similar to bone, is widely used as coating on implants, but it has some mechanical shortcomings especially at joints and load bearings. Composite coating of HA with ceramic and GE particles may overcomedifficulties.

In this work in the first try, composite coating of HA with CNT (CNT) is applied on anodized TI6Al4V alloy, having rough surface, using electrophoretice method in a Butanol2 electrolyte including HA particles with different amounts of CNT (2-5%). The surface morphology and characterization was done using FESEM and XRD. The results showed the Ti surface with nano tube oxides before coating which provided an adherent coating with uniform distribution of CNT with 5% CNT at optimum concentration. Electrochemical polarization and EIS tests appliedon the composite coated substrate in SBF solution showed improved corrosion resistance.
Bioactivity in SBF for 14 days was positive and cell viability increased by 74% over HA-3%CNTcoating.

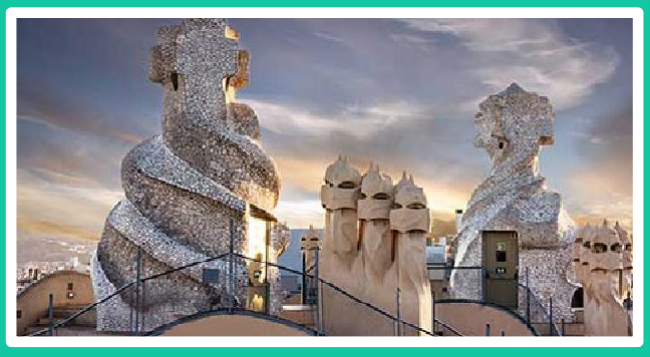
In the second try HA-CNT and HA-Graphene applied on AZ31 Mg alloy with similar improvementin corrosion resistance and bioactivity. Moreover it showed a reduction in H2 gas formation on the coating which is a significant breakthrough. It is concluded that HA composite coatings withCNT and grapheme increase corrosion resistance, adhesion and bioactivity of the coating.

Boqueria Market

Camp Nou Stadium of FC Barcelona

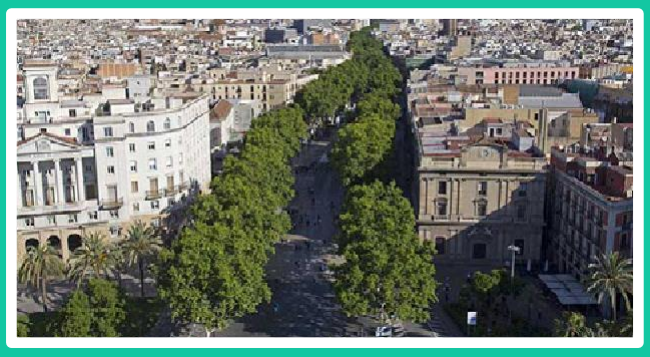


Casa Battló



Casa Milà (La Pedrera)

Hospital de Sant Pau



Las Ramblas

Palau de la Música Catalana

NETWORKING... CONFERENCING... FOSTERING

Attending a Conference isn't all about Learning and Networking

DISCOVERING

A right choice of conference destination is an important aspect of any international conference and keeping that in consideration, ***Future of BSBE 2024*** is scheduled in the Beautiful city "Barcelona'.

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1126 59 Ave East, V5X 1Y9, Vancouver BC, Canada

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