Peers Alley Media
1126 59 Ave East, V5X 1Y9, Vancouver BC, Canada
WhatsApp No: +1 (873) 371-5878

VIRTUAL EVENT

# Future of Biosensors and Bioelectronics

&

# Advances in Structural Biology and Protein Chemistry

June 21, 2024

PEERS ALLEY MEDIA

# PROGRAM-AT-A-GLANCE >>

## YOUR FIRST CHOICE FOR RESEARCH INGENUITY

FUTURE OF BSBE 2024 & ADV. STRUCTURAL BIO 2024

# 2024
JUNE 21 | FRIDAY

# Scientific Program

**BST (British Summer Time)**

| | |
|---|---|
| **06:55-07:00** | **Opening Ceremony** |

**Topics: Biosensors and Bioelectronics | Biosensors Design and Fabrication | Medical Applications of Biosensors | Intelligent and Biosensors | Molecular Biology | Advancements in Structural Biology | Protein Engineering | Cell Biology | Structural Bioinformatics**

**Distinguished Speaker Talks**

| | |
|---|---|
| **07:00-07:20** | **Title: Human-elephant conflict in Sri Lanka, a dreadful environmental problem**<br>**Liyanage Kithsiri Perera,** *University of Southern Queensland, Australia* |
| **07:20-07:40** | **Title: Recent advances of magnetic gold hybrids and nanocomposites and their potential biological applications**<br>**Mirza Muhammad Faran Ashraf Baig,** *The Hong Kong University of Science and Technology, China* |
| **07:40-08:00** | **Title: Identification and characterization of a class of small cytosolic double-stranded DNA**<br>**Kai-Fu Tang,** *Chongqing Medical University, China* |
| **08:00-08:20** | **Title: Biofuel frontier: Transforming agricultural waste into renewable energy**<br>**Sikiru Surajudeen Olalekan,** *Universiti Teknologi Mara, Malaysia* |
| **08:20-08:40** | **Title: Semiconductivity in molecules of Life**<br>**Vengadesh Periasamy,** *Universiti Malaya, Malaysia* |
| **08:40-09:00** | **Title: Design approach and optimization of CMUT for advanced applications**<br>**Ravindra Mukhiya,** *Central Electronics Engineering Research Institute, India* |
| **09:00-09:20** | **Title: Synergistic integration of wastewaters from second generation ethanol plant for algal biofuel production**<br>**Preeti Mehta Kakkar,** *Indian Oil Corporation Limited, Amity University, Noida, India* |
| **09:20-09:40** | **Title: Ultrasound applications for process industries and bio-sensors – Analysis and review**<br>**Paruchuri Gangadhar Rao,** *CSIR-North East Institute of Science and Technology (CSIR-NEIST), India* |

| | |
|---|---|
| **09:40-10:00** | **Title: Investigating the potential of lipids for use as biomarkers for Glioblastoma via an untargeted lipidomics approach**<br>**Serap Sahin Bolukbasi,** *Afyonkarahisar Health Sciences University, Turkey* |
| **Refreshment Break 10:00-10:15** | |
| **10:15-11:00** | **Title: Designing and managing advanced, intelligent and ethical health and social care ecosystems**<br>**Bernd Blobel,** *University of Regensburg, Germany* |
| **11:00-11:20** | **Title: Preferred left-handed conformation of Glycyls at pathogenic sites**<br>**Purva Mishra,** *Indian Institute of Science Education and Research (IISER), India* |
| **11:20-11:40** | **Title: Mastering soft tissue techniques for optimal dental and implant aesthetics**<br>**Meizi Eliezer,** *European Federation of Periodontology Bern University, Switzerland* |
| **11:40-12:00** | **Title: Integration of biosensors and bioelectronics for advanced point-of-care monitoring in Chronic Kidney Disease (CKD)**<br>**Muhammad Subhan,** *Allama Iqbal Medical College, Pakistan* |
| **12:00-12:20** | **Title: Development of advanced nanostructures-based platforms for sensing and removal of pollutants from aqueous solutions**<br>**Monika Nehra,** *Panjab University, India* |
| **12:20-12:40** | **Title: Evaluation of the effectiveness of propolis-pollen nano-emulsion against MDR *E. coli* $O_{157}$ treatment in the broiler**<br>**Dalia Mohammed Ali Ragab Elmasry,** *Agricultural Research Center, Egypt* |
| **12:40-13:00** | **Title: Competitive inhibition and synergistic effects of nutraceutical and metabolite molecules on anti-acetylcholinesterase activity**<br>**Nigar Kantarci-Carsibasi,** *Uskudar University, Turkey* |
| **Lunch Break 13:00-13:40** | |
| **13:40-14:00** | **Title: Adaptive user interface based on accessibility context**<br>**Yousra Bendaly Hlaoui,** *University of Tunis El Manar, Tunisia* |
| **14:00-14:20** | **Title: A microfluidic chip as a tool for prediction the drug toxicity *in vitro***<br>**Pulkova Natalya Vladimirovna,** *Moscow Polytechnic University, Russia* |
| **14:20-14:40** | **Title: Exploring metformin monotherapy response in Type-2 diabetes: Computational insights through clinical, genomic, and proteomic markers using machine learning algorithms**<br>**Angelina Thomas Villikudathil,** *Ulster University, UK* |

| | |
|---|---|
| **14:40-15:00** | **Title: Addressing mental health treatment challenges in low- and middle-income countries: A systematic review of primary care settings during the COVID-19 pandemic**<br>**Sahar Rameez,** *Ph.D Student, Founder- SHAW- Students Health and Well- Being, Lancaster University, UK* |
| **Refreshment Break 15:00-15:15** | |
| **15:15-15:35** | **Title: Holographic microwave imaging and sensing techniques for breast cancer detection**<br>**Lulu Wang,** *Mayo Clinic, USA* |
| **15:35-15:55** | **Title: Single nanoparticle molecule sensors for imaging of single live cells**<br>**X. Nancy Xu,** *Old Dominion University, USA* |
| **15:55-16:15** | **Title: Location-aware ingestible microdevices for wireless monitoring of gastrointestinal dynamics**<br>**Saransh Sharma,** *California Institute of Technology, USA* |
| **16:15-16:35** | **Title: Regulation of mTOR by phosphatidic acid**<br>**Maria Serrano de Sousa Frias,** *St. Francis College, USA* |
| **16:35-16:55** | **Title: Prospective evaluation of the hill model in nanomaterials' bioassays**<br>**Paulo Cesar De Morais,** *Catholic University of Brasilia, Brazil* |
| **16:55-17:15** | **Title: Stress-induced increase in left ventricle diastolic pressure**<br>**Regina Celia Spadari,** *Federal University of Sao Paulo, Brazil* |
| **17:15-17:35** | **Title: Nylon nanofibres as an antibody immobilisation surface in a biosensor device: Study of their reusability and stability**<br>**Ines Peraile Muñoz,** *National Institute for Aerospace Technology "Esteban Terradas" (INTA)-Campus La Marañosa, Spain* |
| **Closing Remarks** | |

# BOOKMARK YOUR DATES

2nd Global Conclave on

# Future of Biosensors and Bioelectronics

2nd Euro-Global Summit on

# Advances in Structural Biology and Protein Chemistry

**June 2025 | London, UK**

PEERS ALLEY MEDIA

DISTINGUISHED SPEAKER TALKS

*Joint Event*

# Future of Biosensors and Bioelectronics

&

# Advances in Structural Biology and Protein Chemistry

**June 21, 2024**

FUTURE OF BSBE 2024 &
ADV. STRUCTURAL BIO 2024

# Human-Elephant conflict in Sri Lanka, a dreadful environmental problem

**Kithsiri Perera[1] and Thakshila D. Gunawansa[2]**

[1]University of Southern Queensland, Australia
[2]Uva Wellassa University, Sri Lanka

Among severe environmental issues in Sri Lanka, Human-Elephant Conflict (HEC) can be counted as the most grave issue due to the number of deaths from both sectors annually. According to World Bank data, Sri Lanka's population was 22.18 million in 2022 and 81.8% of the total population lives in rural regions of the island. The population density of Sri Lanka is also high, with 339 people per sq km (2022) and ranks at 12$^{th}$ place among 50 Asian countries. On the other hand, Sri Lanka is home to about 5,000 wild elephants (10% of Asian elephants) living in their natural habitat. The forest cover in Sri Lanka was reported as 24.8% (1,624,757.5 ha) of the island in 1992 and dropped to 21.0% (1,377,799.1 ha) in 2019. According to records, since 2019, 125 people and 370 elephants have been killed annually on average due to the conflict. The human death rate has increased by approximately 42% over the previous three decades, while Sri Lanka has 2$^{nd}$ highest elephant death rate among countries with high HEC. The limited forest cover for the elephant habitat, ever-increasing rural population, changes in land use and many wild elephants have created a disastrous conflict for food, water and land space between humans and elephants. The present study investigates the severity of the HEC and the factors causing the conflict. The changes in Sri Lankans' land use practices and cultural, religious and historical beliefs about wild elephants and how they have negatively impacted the HEC mitigation efforts are discussed.

## Biography

He was born in Sri Lanka and obtained his Geography special degree from the Univerisity of Colombo in 1985. After serving 4 years in the university academia, he enrolled at Chiba University, Japan, in 1989 and completed his MEng and DEng in satellite remote sensing and GIS (Geographic Information Systems). After graduation, he worked in Tokyo's weather forecasting industry for 12 years. He joined UniSQ in 2008 and he is now in the School of Surveying and Build Environment. His teaching areas include GIS, remote sensing and web-based GIS and his primary research interests are applying GIS and remote sensing to environmental management, disaster monitoring and mapping, land cover/land use mapping and spatial data visualisation.

# Recent advances of magnetic gold hybrids and nanocomposites and their potential biological applications

**Mirza Muhammad Faran Ashraf Baig**

The Hong Kong University of Science and Technology, China

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.

## Biography

His research work mainly focuses on the construction and function of DNA nanomachines, which are cutting-edge and challenging topics. He designed and constructed unique DNA motifs using a short circular DNA nanotechnology technique and functionalized these probes with fluorophores, gold nanoparticles, small molecular drugs and peptide ligands. To achieve plasmon resonance effects, he achieved nano-specific precision in organizing plasmonic nanoparticles on the nano DNA frameworks. His works on the DNA nanomachines provided an efficient fluorescence resonance energy transfer mechanism that realizes the bio-imaging, detection of biological events and functions of the biomolecules. He has also been working on multilayered hybrid magnetic nanoparticles for applications in nanomedicine for the last three years.

# Identification and characterization of a class of small cytosolic double-stranded DNA

**Kai-Fu Tang**

Chongqing Medical University, China

The cyclic GMP-AMP synthase (cGAS)-stimulator of interferon genes (STING) pathway is a major mediator of inflammation following stimulation with >45 bp double-stranded DNA (dsDNA). Herein, we identify a class of ~20-40 bp small cytosolic dsDNA (scDNA) molecules that compete with long dsDNA (200-1,500 bp herring testis [HT]-DNA) for binding to cGAS, thus repressing HT-DNA-induced cGAS activation. The scDNA promotes cGAS and Beclin-1 interaction, releasing Rubicon, a negative regulator of phosphatidylinositol 3-kinase class III (PI3KC3), from the Beclin-1-PI3KC3 complex. This leads to PI3KC3 activation and induces autophagy, causing degradation of STING and long cytosolic dsDNA. Moreover, DNA damage decreases and autophagy inducers increase scDNA levels. scDNA transfection and treatment with autophagy inducers attenuate DNA damage-induced cGAS activation. Thus, scDNA molecules serve as effective brakes for cGAS activation, preventing excessive inflammatory cytokine production following DNA damage. Our findings may have therapeutic implications for cytosolic DNA-associated inflammatory diseases.

## Biography

Dr. Kai-Fu Tang is a professor at the Key Laboratory of Molecular Biology on Infectious Diseases, Ministry of Education, Chongqing Medical University. He was the first person to report the involvement of RNAi machinery in DNA damage repair. In 2008, he reported that knockdown of Dicer, a key component of the RNA interference pathway, induced DNA damage (Tang et al, J Cell Biol, 2008). This finding opened up a new research direction in the RNAi field. Recently, Dr. Tang's group identified a class of ~20–40 bp small cytosolic dsDNA (scDNA) molecules. Functional analysis revealed that scDNA prevents cGAS activation by competing with long dsDNA for binding to cGAS and by inducing autophagic degradation of long dsDNA and STING (Liu et al, Cell Rep, 2023). Dr. Tang has published more than 30 papers in international journals such as J Cell Biol, Genome Biol, Nucleic Acids Res, Oncogene, Cell Rep, Autophagy, Theranostics, Pharmacol Res, Cell Death Dis, Carcinogenesis and J Biol Chem.

# Biofuel frontier: Transforming agricultural waste into renewable energy

**Surajudeen Sikiru**

Universiti Teknologi Mara, Malaysia

Utilizing agricultural waste materials for biofuel generation is a crucial and encouraging method to tackle energy and environmental issues sustainably. This procedure entails the transformation of diverse agricultural leftovers and by-products into biofuels, which may serve as sustainable and more environmentally friendly substitutes for fossil fuels. This study examines various pre-treatment techniques, the production of biofuels and the use of agricultural waste materials as a biomass source for biofuel production. It also explores the use of different feedstocks and technology conversion methods. Combining thermochemical and biochemical conversion methods in biorefineries can improve productivity, minimize waste, optimize resource utilization and reduce environmental impact and energy consumption. This research examines the many challenges related to agricultural waste materials, which include a wide range of substances including crop leftovers (such as straw, husks and shells), animal manure, food processing waste, forestry residues and other similar materials. Scientists and businesses continually strive to enhance the effectiveness and feasibility of converting agricultural waste into biofuels. The research proposes that the inclusion of agricultural waste valorization, namely the use of biochar as a soil supplement, may improve the sustainability of biofuel production. This strategy has the potential to alleviate the impacts of climate change and advance the practice of sustainable agriculture. The implementation of a circular economy approach has the potential to effectively reduce the generation of waste byproducts. The research moreover proposes that governmental measures might bolster sustainable behaviors and provide precedence to renewable energy sources. The research found that the most lucrative and efficient approach for biofuel production is via the use of microalgae and energy crops. This technique has the potential for large-scale commercial production, thanks to breakthroughs in genetic engineering. Nevertheless, the production of biofuels on a wide scale continues to present difficulties, requiring the development of new technologies to enhance output and fulfill energy demands.

## Biography

Dr. Ts. Surajudeen Sikiru Olalekan is a Senior Lecturer at the School of Physics and Materials Studies Faculty of Applied Sciences at Universiti Teknologi Mara (UiTM) Shah Alam Malaysia. He has experience as a Postdoctoral researcher at the Center of Subsurface Imaging (CSI) and the Institute of Power Engineering Universiti Tenaga Nasional (UNITEN). He served as a research officer at the Fundamental and Applied Science Universiti Teknologi PETRONAS under the Advanced Electromagnetic Center and Hydrocarbon Recovery Center from 2017 to 2018. Dr. Surajudeen holds a Doctor of Philosophy in Applied Science from Universiti Teknologi PETRONAS Malaysia, a Master of Science and a Bachelor of Technology in Pure and Applied Physics from Ladoke Akintola University of Technology Ogbomoso Nigeria. His areas of expertise include Electromagnetic modelling $CO_2$ sequestration, enhanced oil recovery, hydrocarbon prediction using electromagnetic waves, nanotechnology in oil and gas, Molecular dynamics simulation, materials characterization, sustainable energy, material simulation, magnetic and dielectric nanoparticles, phase change materials, supercapacitors, graphene and carbon nanotubes, solar radiation and renewable energy application.

# Semiconductivity in molecules of life

**P. Vengadesh**

Department of Physics, Universiti Malaya, Malaysia

Molecular biology has been moving towards development of high throughput, small-scale platforms for various applications from medical research to molecular diagnostics. Advanced technologies, although mostly precise and sensitive, are expensive, time-consuming and require laboratory equipment and technical expertise. In addition, these tools are designed to target 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 electronic point 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 electronic signals 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 electric field, 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 near future.

### Biography

A biophysicist by interest, Assoc. Prof. Dr. Vengadesh Periasamy is the Deputy Head of Low Dimensional Materials Research Centre (LDMRC) in the Department of Physics, Faculty of Science, University of Malaya. He is also the Founder, Director and CPO of eProfiler Solutions Ltd (UK) and the Founder and Director of eProfiler Solutions Malaysia Sdn Bhd. Dr. Vengadesh obtained his degrees, BSc. (Hons) in Physics, MSc. (Applied Physics) and PhD. (Physics) from the same university. His fields of expertise and interest mainly involves nucleic acids and protein electronics, Langmuir-Blodgett (LB) and Biophotovoltaic (BPV). Dr. Vengadesh is pursuing frontier research into nucleic acids and protein electronics, which would enable rapid DNA/RNA/protein detection. He focuses on development of solid-state sensors for the detection and identification of virus, bacteria, fungus and other organisms. The first in its class of electronic sensors, which are now patented, allows a universal detection method based on characteristic electronic profiles (eProfiles).

# Design approach and optimization of CMUT for advanced applications

**Ravindra Mukhiya[1,2], Shuvam Gupta[1,2], Prateek Kothari[1]** and **Rishi Sharma[1,2]**

[1]CSIR - Central Electronics Engineering Research Institute (CSIR-CEERI), India
[2]Academy of Scientific and Innovative Research (AcSIR), India

Micro-electro-mechanical system (MEMS) technology has emerged as an integral part of modern sensors and actuators development and found a variety of applications in medical science, strategic sectors and consumer electronics. Recent developments in MEMS-based capacitive micromachined ultrasonic transducers (CMUT) have shown promising results for biomedical applications in ultrasound imaging, high-intensity focused ultrasound (HIFU) for therapeutic and biosensing applications. The wider bandwidth, better transducer sensitivities and high resolutions are the prerequisites for biomedical applications that demand high-frequency operation (1-10 MHz range). Design and modelling of the transducers aid fabrication optimization for device development. In the study, the various steps involved in the design, modelling and optimization of CMUT for biomedical applications operating at 5 MHz resonating frequency are discussed in detail.

The design flow adopted for the development of CMUT as shown in Fig.1 involves micromachining techniques used in MEMS technology to realize thin gaps between the fixed and flexible membrane to build a large magnitude of electric field between the plates. Bio-compatible materials which include silicon and silicon dioxide thin film are taken to form the device structure along with the passivation layer. Out of the explored geometry of the CMUT cell of hexagonal, square, circular and elliptical shapes, the circular cell showed the maximum sensitivity and minimum stress developed. The dimensions of the structure are selected in compliance with the frequency of operation, operating voltage, sensitivity and output power. Ease of fabrication and ability to produce multiple structures (arrays) to improve the output power and sensitivity are additional leverages provided by MEMS technology.


Fig. 1 Design flow adopted for CMUT device

The CMUT design, consisting of structure analysis, cavity depth or gap, with considering the effects of mass loading and acoustic impedance for 5 MHz transducer will be discussed and presented. Both the types of electromechanical analysis, viz., static and dynamic will be presents in this paper.

## Biography

Dr. Ravindra Mukhiya received his Ph.D. degree in the area of MEMS from Indian Institute of Technology, Kharagpur, India, in 2010. Presently, Dr. Mukhiya is working as a Principal Scientist in Semiconductor and Microsystems Group at CSIR-Central Electronics Engineering Research Institute, Pilani, India. He is also serving as an Associate Professor in the Academy of Scientific and Innovative Research. He is currently involved in the development of MEMS-based sensors/actuators. His research interest includes design, process development, integration, fabrication and systems integration. He was involved in more than fifteen research and development projects, financially supported by CSIR, DRDO, ISRO, DAE and DST, India. He has also served as Head of Process Technologies Group at CSIR-CEERI, Pilani during April 2017 to July 2020. He has published more than 80 research papers in international/national journals/conferences and books chapters. Dr. Mukhiya is a Fellow of IETE, India; Senior Member of IEEE, USA; Life Members of Semiconductor Society of India (SSI) and Institute of Smart Structures & Systems (ISSS), India. He has also been Visiting Researcher at FBK, Trento; and IMM-CNR, Rome, Italy.

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

**Preeti Mehta Kakkar, Rekha Rani, Ravi Gupta, S. K. Puri** and **A. S. Mathur**

Indian Oil Corporation Limited, Amity University, Noida, India

This study introduces system for algal biofuel production that synergistically integrates with treatment and usage of chemicals in waste waters generated from 2G ethanol pretreatment 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* (*C. 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 $mgL^{-1}d^{-1} \pm 4.07$) and lipid (157.71 $mgL^{-1}d^{-1} \pm 1.09$) 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.

## Biography

Dr. Preeti Mehta Kakkar research in DBT-IOC Centre, Indian Oil Corporation Limited, is directed towards exploitation of innovative and sustainable bio resources and to develop new and improved applications for renewable biofuels, nutraceuticals, bio-materials and chemicals. She has extensive research experience in the field of Biofuels, Bioproducts & Biorefining. She has extensive experience in the area of “3rd Generation biofuel production along with high value added co products”. She developed integrated novel process for $CO_2$ / industrial wastes conversion to Omega 3 fatty acids leading to 9 International Patents. Her current interests lie in Carbon Utilization/valorization ($CO_2$/other waste gases/ industrial wastes) by gas fermentation and production of bio materials to develop an ‘Integrated Biorefinery Process’. During her visit to Murdoch University, Australia she developed novel processes for oil extraction without killing the cells (Algal milking). She has been awarded with prestigious awards “Young Scientist Award and Endeavour fellowship”.

# Ultrasound applications for process industries and bio-sensors – Analysis and review

**Paruchuri Gangadhar Rao**[2] and **Venkatasubramanian Sivakumar**[1]

[1]Council of Scientific and Industrial Research (CSIR), India
[2]CSIR-North East Institute of Science and Technology (CSIR-NEIST), India

Ultrasound is a sound wave with a frequency above the human audible range (16 Hz to 16 kHz). Ultrasound having frequency range of 20 -100 kHz is termed as power ultrasound and commonly employed for enhancing physical processes such as cleaning, emulsification, extraction etc. and chemical reactions. Ultrasound having frequency range of 1-10 MHz is termed as diagnostic ultrasound, used in non-destructive testing. Ultrasound is generated by Piezo-electric transducers, which convert electric signals of ultrasound frequency, as generated by ultrasound signal generators into mechanical vibrations of ultrasound frequency, which are realized in the medium of processing. Process industries such as textiles, leather, chemicals and bio-sensors require sustainability and cleaner methods. In this regard, use of ultrasound is being widely studied in various unit operations and processes with numerous benefits. Ultrasound could be effectively used in order to facilitate the cleaner/greener process. In the presentation, use of ultrasound in leather processing, leather chemicals preparation, diffusion, Bio-processing (Enzyme application) of leather will be analyzed. Use of ultrasound in Leather processing stages such as vegetable tanning, dyeing, fat liquoring and solid-liquid extraction (vegetable tannins & Natural dye from plant materials) have provided significant enhancement in diffusion rate, mass transfer enhancement and improved process efficiency. In addition, use of ultrasound in Biosensor applications such as Nano-particle preparation, Enhanced drug delivery, ultrasound imaging for bio-molecules and food quality control could be beneficial. The presentation will showcase how ultrasound techniques can be helpful in developing the use of ultrasound in leather processing and also in biosensors, with some examples from current research.

## Biography

Dr. Rao is currently Independent Director at BitChem, Guwahati, India. He is a Fellow of International Academy of Food Science & Technology, National Academy of Science, India, Institution of Engineers (India) and Indian Institute of Chemicals Engineers. He formerly served as Director of CSIR-North East Institute of Science & Technology, Vice Chancellor, University of Science & Technology, Meghalaya and Distinguished Scientist of CSIR, in India.

Dr. Rao is basically a Chemical Engineer with Ph D and M Tech from IIT, Madras, B. Tech from NIT Warangal, India. His Professional experience is in taking Technologies from Lab to Industry. He has 134 publications in peer reviewed journals, 21 patents, 3 copy rights, 2 books and 10 chapters in books to his credit. He guided thesis of 10 Ph D students. Dr. Rao is recipient of several national awards and visited number of countries.

# Investigating the potential of lipids for use as biomarkers for Glioblastoma via an untargeted lipidomics approach

**Serap Sahin-Bolukbasi[1], Burcak Soylemez[1]** and **Zekeriya Bulut[2]**

[1]Department of Neurosurgery, Sivas Cumhuriyet University Hospital, Turkey
[2]Faculty of Pharmacy, Department of Biochemistry, Afyonkarahisar Health Sciences University, Turkey

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 application 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 untargeted lipidomic approach. Gaining a deeper understanding of lipid metabolism in patients with GB can contribute to the early diagnosis with GB patients 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.

## Biography

Assoc. Prof. Dr. Serap Sahin-Bolukbasi completed her Ph.D. studies on Biochemistry at The Sivas Cumhuriyet University. She performed post-doctoral studies at The University of Georgia (UGA) Collage of Pharmacy, Department of Pharmaceutical and Biomedical Sciences. She is an Assoc. Prof. Dr. at the Afyonkarahisar Health Sciences University, Faculty of Pharmacy, Department of Biochemistry since 2021. She has published many research articles in SCI (E) journals and presented more than 80 presentations at national/international conferences. Dr. Sahin-Bolukbasi's research focuses on lipidomic, lipid metabolism in cancer, lipid biomarkers for rare and common diseases, new treatment targets based on lipid metabolism, cell culture, development of biotechnological aptamers in cardiovascular diseases and cancer.

# Designing and managing advanced, intelligent and ethical health and social care ecosystems

**Bernd Blobel**[1,2,3]

[1]University of Regensburg, Germany
[2]Visiting Professor at Charles University Prague, First Medical Faculty, Visiting Professor at the University of Genoa Prague, Czech Republic
[3]Faculty European Campus Rottal-Inn, Deggendorf Institute of Technology, Germany

For meeting the financial, quality and safety challenges as well as expectations of the patients, health and social care systems around the globe currently undergo a transformation towards personalized, preventive, predictive, participative precision medicine (5PM), supported by technology. It considers individual health status, conditions, genetic and genomic dispositions in personal social, occupational, environmental and behavioral context, understanding the pathology of diseases and turning health and social care from reactive to proactive. The aforementioned transformation is strongly supported by technologies such as micro- and nanotechnologies, advanced computing, artificial intelligence, autonomous systems and robotics, knowledge representation and management, etc. Beside their opportunities, those advanced technologies also bear risks to be managed, requiring the detailed consideration from a humanistic, moral and ethical perspective. For enabling communication and cooperation between all actors from different disciplines involved, using different methodologies, perspectives, intentions, languages, we shall understand and formally and consistently represent the multidisciplinary, highly complex and dynamic 5PM ecosystem. The outcome is a system-theoretical, architecture-centric, ontology-based, policy-driven approach for designing and managing intelligent and ethical 5PM ecosystems. The necessary model and framework has been developed by the author and meanwhile standardized as ISO 23903 Interoperability and Integration Reference Architecture. The formal representation of any ecosystem and its development process including examples of practical deployment of the approach are presented in detail. This includes correct systems and standards integration and interoperability solutions.

## Biography

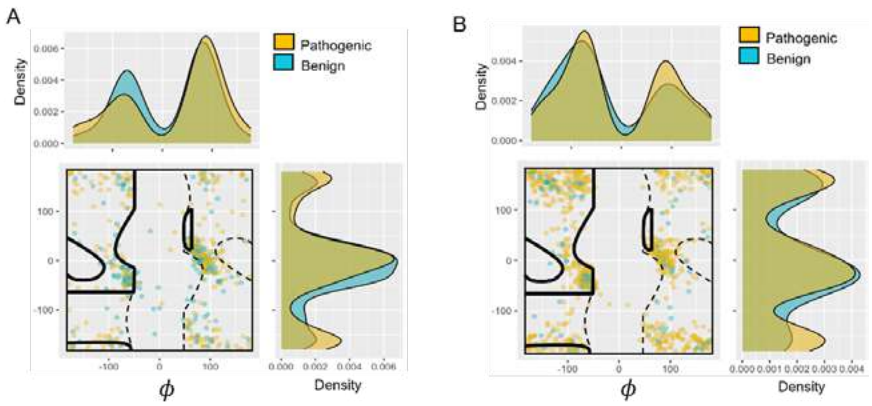
Dr. Bernd Blobel received a multi-disciplinary education, covering mathematics, physics, systems engineering, electronics, medicine, informatics and medical informatics, including habilitations in medicine and informatics. He was Head of the Institute for Biometrics and Medical Informatics at the University of Magdeburg and thereafter Head of the Health Telematics Project Group at the Fraunhofer IIS in Erlangen. Thereafter, he acted until his retirement as Head of the German National eHealth Competence Center at the University of Regensburg. He was leadingly involved in many countries health digitalization as well as electronic health record strategy. He was and is still engaged in international standardization at ISO, CEN, HL7, OMG, IEEE etc. Furthermore, he still engaged in international higher education. He is Fellow of several international academies.

# Preferred left-handed conformation of Glycyls at pathogenic sites

**Purva Mishra, Rajesh Potlia** and **Kuljeet Sandhu**

Indian Institute of Science Education and Research (IISER), India

The role of glycyl residues in the protein structure has lingered within the research community for the last several decades. Glycyl residue is the only amino acid that is achiral due to the lack of a side chain and can, therefore, exhibit Ramachandran conformations that are disallowed for L-amino acids. The structural and functional significance of glycyl residues with L-disallowed conformation, however, remains obscure. Through statistical analysis of various datasets, we found that the glycyls with L-disallowed conformations are over-represented at disease-associated sites and tend to be evolutionarily conserved. The mutations of L-disallowed glycyls tend to destabilize the native conformation, reduces the protein solubility and promotes inter-molecular aggregations. We uncovered a structural motif referred as "$\beta$-crescent" formed around the L-disallowed glycyl, which prevents $\beta$-sheet aggregation by disrupting the alternating pattern of $\beta$-pleats. The L-disallowed conformation of glycyls also holds predictive power to infer the pathogenic missense variants. Altogether, our observations highlight that the L-disallowed conformation of glycyls are selected to facilitate the native folding and prevent inter-molecular aggregations. The findings may also have implications in designing more stable proteins and prioritizing the genetic lesions implicated in diseases.



## Biography

She is pursuing PhD. at IISER Mohali, India, under the supervision of Dr. Kuljeet Sandhu. She has attended several other national conferences like the Society of Biological Chemists, BITS Pilani, Goa, DBS Seminar Day, IISER Mohali, etc. She has been an organizer at the Seminar Day at IISER Mohali. Regarding her research career, she has done an internship at IIT, Guwahati, during her bachelor's degree, where she gained an interest in proteins. She completed her master's degree in bioinformatics at BHU, Varanasi, where she tried to explore the potential of flavonoids (which can serve as substitutes for standard chemical compounds) through bioinformatics approach.


# Mastering soft tissue techniques for optimal dental and implant aesthetics

**Meizi Eliezer**

Periodontology & Implantology Specialisation Accreditation European Federation of Periodontology Bern University, Switzerland

Dental professionals understand the pivotal role that soft tissues play in achieving exceptional aesthetic outcomes for both natural teeth and dental implants. This presentation aims to provide dentists with a comprehensive insight into advanced soft tissue manipulation techniques, enabling them to elevate their clinical skills and deliver enhanced aesthetic results.

The lecture will explore the critical relationship between gingival health, architecture and overall smile esthetics. Attendees will gain a profound understanding of how soft tissue contours frame teeth and implants, influencing appearance and long-term stability.

Practical approaches to managing soft tissue deficiencies will take center stage. Detailed discussions on connective tissue grafts, tunnel techniques and peri-implant soft tissue management will equip attendees with practical knowledge to address challenges like recession, inadequate keratinized tissue and compromised emergence profiles.

Real-world case presentations will showcase the successful application of these techniques, highlighting their impact on patient satisfaction and treatment longevity. Attendees will learn to customize treatment plans based on individual patient goals and anatomical considerations.

In conclusion, this lecture seeks to empower periodontal and general practitioners with a comprehensive toolkit of soft tissue management strategies for teeth and implants. By bridging the gap between scientific insights and clinical practice, attendees will be well- prepared to navigate the intricacies of soft tissue manipulation, fostering enhanced periodontal health and aesthetic excellence.

# Integration of biosensors and bioelectronics for advanced point-of-care monitoring in Chronic Kidney Disease (CKD)

**Muhammad Subhan[1], Dharani Swarna Deiveegan[2], Muhammad Waqas[3], Gopi Sairam Reddy Mulaka[4], Mohammad Alhasan[5]** and **Ruqiya Bibi[1]**

[1]Internal Medicine, Allama Iqbal Medical College, Pakistan
[2]KAP Viswanatham Government Medical College and Mahatma Gandhi Memorial Government Hospital, India
[3]Internal medicine, Jinnah Sindh Medical University, Pakistan
[4]Caribbean Medical Graduate Internal Medicine Aspirant, St. Martinus University faculty of Medicine, Curacao
[5]I. N. Ulianov Chuvash State University, Luxembourg

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.

## Biography

Dr. Muhammad Subhan, is a General Practitioner and a medical researcher from Pakistan. He graduated with a Bachelor of Medicine and Bachelor of Surgery (MBBS) from Allama Iqbal Medical College Lahore and completed his internship at Jinnah Hospital Lahore. He has passed the United States Medical Licensing Exams Step 1 and am preparing for Step-2 and OET. He has published 11 research articles including review articles, case reports and Ebook chapters in the field of Medicine and Surgery and he is a reviewer for CUREUS and International Journal of Gastroenterology. He is the editor of International Journal of Oncology. Currently working as a Medical Officer in Al Barkat Health Care and Collection Centre Chung Lahore. He is passionate about providing quality health care and excellent treatment to his patients and improving his professional, practical and personal skills.

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

**Monika Nehra[1,2], Neeraj Dilbaghi[2], Rajesh Kumar[1]** and **Sandeep Kumar[2,3]**

[1]Department of Mechanical Engineering, Panjab University, India
[2]Department of Bio and Nano Technology, Guru Jambheshwar University of Science and Technology, India
[3]Department of Physics, Punjab Engineering College (Deemed to be University), India

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.

## Biography

Dr. Monika Nehra has completed her Ph. D. in Electronics and Communication Engineering from Guru Jambheshwar University of Science & Technology, Hisar (2019) and she is presently working as CSIR-Senior Research Associate/Pool Scientist at the Department of Mechanical Engineering, UIET, Panjab University, Chandigarh, India. She has worked as Young Innovator at GJUS&T, Hisar. She is a recipient of National Post-Doctoral Fellowship (NPDF), awarded by Department of Science & Technology, India. She has published more than 30 research papers in many reputed international journals. Her research interests include engineered nanostructures for energy and environmental applications. She has visited UAE, South Korea, USA, Portugal and Italy for numerous scientific and research events.

# Evaluation of the effectiveness of propolis-pollen nano-emulsion against MDR *E. coli* $O_{157}$ treatment in the broiler

**Dalia M.A. Elmasry[1], Jihan M. Badr[2], Waleed A. Ibrahim[3], Abd Elfattah I. El-Zanaty[4], Maha S. Abd Elhafeez[5]** and **Aalaa S. Saad[6]**

[1]Nanomaterials Research and Synthesis Unit, Animal Health Research Institute, Agricultural Research Center (ARC), Egypt
[2]Bacteriology unit, Poultry disease diagnosis and research Dept., Animal Health Research Institute, Agricultural Research Center, Egypt
[3]Reference Laboratory for Veterinary Quality Control on Poultry Production, Animal Health Research Institute, Agriculture Research Center, Egypt
[4]Avian Pathology unit, Poultry disease diagnosis and research Dept., Animal Health Research Institute, Agricultural Research Center, Egypt
[5]Pharmacology unit, Chemistry, Toxicology and Feed Deficiency Department, Animal Health Research Institute, Agricultural Research Center, Egypt
[6]Biotechnology Research Dept., Animal Health Research Institute, Agricultural Research Center, Egypt

*Escherichia coli* $O_{157}$ 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, stx*1, *stx*2, *cnf1/2, hlyA, iss* and *ompA*) and ESBL-resistant genes (*blaTEM, blaSHV* and *AmpC*) and histopathological changes on *E.coli* $O_{157}$ 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* $O_{157}$); 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* $O_{157}$ 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* $O_{157}$ toxin and ESBL-resistant genes. As conclusion *E.coli* $O_{157}$-infected broiler hens treated with nanomaterials and antibiotics had milder lesions and lower toxin and antibiotic-resistant gene expression.

### Biography

Dalia is an Associate prof., she has experienced nanomaterials synthesis and application with a demonstrated history of working in the nanomaterials Research and synthesis unit, AHRI institute and active participation trainer in "Nanotechnology Application in the Veterinary Field, since 2012. She developed this nanomaterial synthesis after years of research, evaluation and administration in the field and in research institutions.

Dalia is the PI of the STFA project of Innovation Grant 2021. Dalia is Skilled in chemical safety and security training programs, Biosafety Laboratory and Quality Management. Also, visitor Researcher at the Nanobioelectronics & Biosensors Group, Catalan Institute of Nanoscience and Nanotechnology (ICN2), (Barcelona), Spain. Dalia has been one of the Judges for STEM school from 2016 till now known in Egypt, Dokki, Giza. Dalia had a TOT-Certificate, in 2012. She has many publications in nanotechnology research.

# Competitive inhibition and synergistic effects of nutraceutical and metabolite molecules on anti-acetylcholinesterase activity

**N. Kantarci-Carsibasi[1], M. Girgin[1], S. Isik[2]** and **S. Tarbiat[2]**

[1]Department of Chemical Engineering, Uskudar University, Turkey
[2]Department of Molecular Biology and Genetics, Uskudar University, Turkey

The rapidly increasing prevalence of Alzheimer's disease (AD) poses a significant global public health threat. While medications such as Donepezil, Galantamine and Rivastigmine are used, their serious side effects and limited healing fail to provide a definite cure. Consequently, combination therapies are being explored to enhance the efficacy of existing drugs. We recently conducted a comprehensive *in silico* screening to identify effective natural source molecules as potential inhibitors of acetylcholinesterase enzyme (AChE) for the treatment of AD. Queuine, Etoperidone and Thiamine yielded promising docking scores and interactions estimated by molecular docking. Stable complex formation was observed as explored by molecular dynamics simulations and effective half-inhibitory concentrations were achieved in neuroblastoma cell lines. Combined use of Queuine with Donepezil, Etoperidone and Thiamine on acetylcholinesterase enzyme inhibition is also evaluated. The effects of the drug combinations on cell viability and acetylcholinesterase inhibition were investigated by using safe doses determined for each drug. The cytotoxic effect of drug combinations was investigated on the SH-SY5Y cell line using the RTCA method. All the individual or drug combinations were non-toxic to neuronal cells. Anti-acetylcholinesterase activities were estimated by Ellman's method yielding the inhibition percentages as 70%, 61%, 45% and 51% for Donepezil, Etoperidone, Queuine and Thiamine, respectively. When drug combinations were analyzed, competitive inhibition resulted for Queuine+Donepezil and Queuine+Thiamine, the enzyme inhibition percentages being diminished to 47% and 21%, respectively. A significant synergistic effect was observed for Queuine+Etoperidone with the highest inhibition of 74%. Queuine, a nutraceutical molecule, had been previously linked to amyloid beta (Aβ) related cascade in AD (ref). Queuine also shows potential neuroprotective effects linked to the anticholinergic mechanism as well, as it was found to be more effective than the approved drug Galantamine at inhibiting AChE activity and synergistic boosted activity in combined use with Etoperidone, surpassing the

effectiveness of Donepezil. This suggests that Queuine may be a potential multi-target drug (MTD) that can inhibit multiple proteins involved in AD pathogenesis.

### Biography

Born in 1979 in Istanbul, Dr. Nigar Kantarcı Çarşıbaşı completed her undergraduate education at Boğaziçi University, Department of Chemical Engineering in 2001. Between 2001 and 2003, she continued her master's degree in Boğaziçi Chemical Engineering and during this time she conducted hydrodynamic and heat transfer studies on Bubble Column Reactors. She carried out her doctoral studies at Boğaziçi Chemical Engineering Polymer Research Center between 2003-2009. Kantarcı Çarşıbaşı worked on short protein chains that bind to metals by molecular dynamics simulation within the scope of her doctoral studies. In another study, she conducted modeling studies on the p53 protein, an important tumor suppressor protein and its interaction with DNA. Within the scope of her doctoral thesis, she modeled the conformational transitions of proteins using a mathematical modeling technique, she developed and by combining the Anisotropic Network Model with the Monte Carlo Technique, she investigated the transition pathways for many proteins from open to closed, from free to bound form. She continues her studies at Üsküdar University, Faculty of Engineering and Natural Sciences, Department of Chemical Engineering. Dr. Kantarcı Çarşıbaşı's academic research areas are: bioinformatics, protein modeling, protein-protein interactions, protein-structure-function relationship, computer aided drug design.

# Adaptive user interface based on accessibility context

**Yousra. Bendaly Hlaoui**

Faculty of Sciences of Tunis, University of Tunis El Manar, Tunisia

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.

## Biography

She was interested on the model transformation and the proof of model semantic preservation during the transformation process. To prove the semantic preservation, she use formal methods, frameworks and tools such as model checking, theorem proving NuSMV, event B and institution theory. She has applied her approaches to the e-assessment the field, the UI context aware adaptation field, cloud service business process refinement and flexibility field in order to prove their validity.

# A microfluidic chip as a tool for prediction the drug toxicity *in vitro*

**N. Pulkova**[1] and **I. Kuznetsova**[2]

[1]Moscow Polytechnic University, Russia
[2]HSE University, Russia

Most drugs are metabolized in liver, which may lead to their activation or inactivation by liver enzymes. As a result, the parent compound pharmacokinetics and pharmacodynamics might be affected. *In vivo* studies are expensive and sometimes fail to predict the effect of the drug in human due to the species-specificity. Thus, a reliable *in vitro* system is needed to predict the drugs toxicity, prodrugs in particular.

In this work, we used multi-organ chip "Homunculus" (STC “BioClinicum”), which consisted of a replaceable cell block and control unit for suppling culture medium at a given frequency and pressure, similar to the blood circulation *in vivo*.

HepaRG cell spheroids, which were formed by the hanging drop method, were chosen as a liver model. Cultivation of a 3D liver model with a given circulation of culture medium led to the up-regulation of xenobiotic metabolism genes, as well as the genes involved in cell protection from reactive oxygen species and mediated an increase in albumin synthesis.

When 3D HepaRG and 2D HaCaT cells were co-cultured in a microfluidic chip, 48h of incubation in adopted serum-free medium with 3.8 mM cyclophosphamide (CP) had no effect on HaCaT cell viability in the absence of liver cells, whereas co-culture with HepaRG spheroids resulted in HaCaT death above 40% (test with neutral red), which can be explained by the formation of a cytotoxic metabolite by hepatocytes. Besides, 3.8 mM CP had no reliable hepatotoxic effect at the co-cultivation with 2D HaCaT under the dynamic conditions, unlike without a medium circulation.

Thus, we demonstrated that the use of a dynamic multi-organ chip can be a promising tool for drug toxicity prediction with metabolites’ cytotoxic effect record *in vitro* due to possible co-cultivation of liver cells and target organ cells at medium circulation, similar to *in vivo* studies.

## Biography

Ph.D. in biological sciences, associate professor at Moscow Polytech, expert in the field of biomedicine and higher education system design.

2009 - Master, specialization in molecular and cellular biotechnology in MITHT.

2013 - Ph. D, specialization in cellular biology, cytology and histology, postgraduate study in MSU.

Scientific interests: Medical biotechnologies, including neurobiology, bioengineering, stem cell biology, regenerative medicine, immune system management, "Human-on-a-chip" technology and pharmacology.

WoS Researcher ID (E-3123-2014), Scopus Author ID (55326788400). Scientific and teaching experience: 18 years.

Participated in the development of multi-organ chip "Homunculus" (STC “BioClinicum”, 2012/2015). Headed department of chemical technology and biotechnology at Moscow Polytech (2015/2018). Organized and led the profile "Engineering biological systems" at the All-Russian Olympiad NTI (2016/2017). Was a member of the FoodNe NTI working group (2016), expert of generations AgroBioTech&Food (2017), reviewer since 2019. Have more than 15 scientific articles, patent of invention (RU2425425C2), publication in TASS (2022).

# Exploring metformin monotherapy response in Type-2 diabetes: Computational insights through clinical, genomic and proteomic markers using machine learning algorithms

**Angelina Thomas Villikudathil[1], Declan H. Mc Guigan[1]** and **Andrew English[2]**

[1]Ulster University, United Kingdom
[2]Teesside University, United Kingdom

**Background:** In 2016, the UK had 4.5 million people with diabetes, predominantly Type-2 Diabetes Mellitus (T2DM). The NHS allocates £10 billion (9% of its budget) to manage diabetes. Metformin is the primary treatment for T2DM, but 35% of patients don't benefit from it, leading to complications. This study aims to delve into metformin's efficacy using clinical, genomic and proteomic data to uncover new biomarkers and build a Machine Learning predictor for early metformin response detection.

**Methods:** Here we report analysis from a T2DM dataset of individuals prescribed metformin monotherapy from the Diastrat cohort recruited at the Altnagelvin Area Hospital, Northern Ireland.

**Results:** In the clinical data analysis, comparing responders (those achieving HbA1c ≤ 48 mmol/mol) to non- responders (with HbA1c > 48 mmol/mol), we identified that creatinine levels and bodyweight were more negatively correlated with response than non-response. In genomic analysis, we identified statistically significant (p-value <0.05) variants rs6551649 (LPHN3), rs6551654 (LPHN3), rs4495065 (LPHN3) and rs7940817 (TRPC6) which appear to differentiate the responders and non-responders. In proteomic analysis, we identified 15 statistically significant (p-value <0.05, q-value <0.05) proteomic markers that differentiate controls, responders, non-responders and treatment groups, out of which the most significant were HAOX1, CCL17 and PAI that had fold change ~2. A machine learning model was build; the best model predicted non-responders with 83% classification accuracy.

**Conclusion:** Further testing in prospective validation cohorts is required to determine the clinical utility of the proposed model.

## Biography

Dr. Angelina Villikudathil, Ph.D., is a Postdoctoral Researcher at Mahatma Gandhi University in Kottayam, Kerala, India, specializing in Computational Biology and Bioinformatics. She grew up in Kuwait, where she excelled in academics and won a national science festival award. She earned her Bachelor's in Bioinformatics at Karunya University, India, followed by a competitive research internship at the Indian Institute of Technology Bombay. Dr. Villikudathil received a Vice-Chancellor's Research Scholarship for her Ph.D. at Ulster University, UK, focusing on machine learning for biomarker discovery in type-2 diabetes. She is skilled in Python, big data preprocessing and statistical analysis with R programming. She has completed her Ph.D. with expertise in genomics, proteomics and clinical data analysis. During her Ph.D., Dr. Villikudathil won a national 3-Minute Thesis competition, a Hackathon prize and received several travel grants. She also holds certifications in data science, machine learning and Good Clinical Practice from NHS UK.

# Addressing mental health treatment challenges in low- and middle-income countries: A systematic review of primary care settings during the COVID-19 pandemic

**Sahar Rameez** and **Almas Nasir**

Ph.D Student, Founder- SHAW- Students Health and Well- Being, Lancaster University, UK

General primary care workers and family physicians are a crucial work force in managing the mental health of people in any given region. However, the barriers they face in low- and middle-income countries (LMICs) may be worsened by the pandemic. This review aims to bring together evidence about mental health treatment challenges experienced by people in LMICs in primary care settings. The review focuses on the shortage of essential mental healthcare services, stigma and lack of competent primary care professionals in establishing these services and their importance in the COVID-19 pandemic context. The systematic review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and the search strategy included keyword search terms (MeSH) to perform a search across three electronic databases - Critical Appraisal Skills Program assessed PubMed, SpringerLink and Cochrane and quality of the articles. The articles selected were analysed through thematic analysis to identify the main themes and conclude our findings. Findings indicate that out of 1792 publications found, 14 studies matched the desired criteria for the studies. Endnotes, database search filters and Covidence data extraction tools were used to generate the relevant articles in this study. This study shows that primary care institutions have financial and management issues in providing mental health services and a shortage of competent mental health experts in primary care, especially mental health-trained family physicians. The study also identifies community stigma as the most prevalent barrier to seeking mental health therapy, reflecting the lack of community health education in LMICs.

## Biography

Dr. Sahar Rameez is an accomplished Pakistani medical doctor who has made significant contributions to the field of Public Health in Canada and Pakistan. She is the founder of SHAW- Pakistan, a platform that focuses on health and empowering young students through research and leadership programs. Her work strategically centers around the critical domain of youth mental health, leveraging cutting-edge digital health solutions to proactively address early prevention. Additionally, she spearheads initiatives in the realm of global mental

health, diligently working towards the seamless integration of mental health services within primary care settings. As a highly accomplished Ph.D. student at the prestigious Lancaster University, she is diligently engaged in cutting-edge research that strategically tackles the formidable barriers obstructing the realm of youth mental health. She is also currently working as a consultant, at Be the Change Group, Vancouver, BC, Canada.

# Holographic microwave imaging and sensing techniques for breast cancer detection

**Lulu Wang**[1,2]

[1]Mayo Clinic, USA
[2]Reykjavik University, Iceland

Breast cancer remains the primary cause of cancer-related deaths among women worldwide. Timely identification and monitoring of breast lesion are critical and medical imaging plays a pivotal role. However, conventional medical imaging methods such as X-ray mammography, ultrasound and magnetic resonance imaging (MRI) have limitations. Although X-ray mammography is the most widely used breast cancer imaging tool, it does not suitable for pregnant women or people with dense breasts. Ultrasound imaging produces low-quality images that may not accurately identify cancerous cells. MRI is more effective in detecting breast cancer, but it is expensive. Microwave breast imaging, with its non-ionizing, non-invasive and cost-effective nature, offers promise. Recent advancements in microwave breast imaging have opened new avenues for early breast cancer diagnosis and treatment. By combining microwave imaging and sensing techniques with artificial intelligence (AI) techniques, breast tumors can be rapidly and affordably identified and classified. This talk will discuss the recent achievements in holographic microwave imaging and sensing techniques for breast cancer detection. This talk will discuss the working principles, applications and advantages of holographic microwave imaging and sensing techniques over traditional medical imaging. Additionally, it explores AI integration to enhance accuracy and efficiency in breast cancer detection.

## Biography

Lulu Wang is currently a visiting scientist at Mayo Clinic, USA and a Full Professor at Reykjavík University, Iceland. She is a seasoned professional with 10+ years of experience showcasing expertise in diverse fields such as Electromagnetic imaging techniques for biomedical applications, Artificial Intelligence, Microwave sensors, Microwave signal processing and imaging analysis and Application Engineering. She is recognized as one of World's Top 2% Scientists in 2021 and 2023 by Stanford University. Elected as ASME Fellow in 2022. Proven track record of delivering exceptional results, emphasizing precision and innovation. Committed to leveraging extensive experience to drive academic excellence and contribute to cutting-edge advancements. Dr. Wang is a member of IEEE, MRSNZ, AAAS, PSNZ and IPENZ. She is an active editor/reviewer of 40 journals, books and conferences. She has given more than 40 invited talks at national and international conferences.

# Single nanoparticle molecule sensors for imaging of single live cells

**X. Nancy Xu, Preeyaporn Songkiatisak** and **Pavan Kumar Cherukuri**

Department of Chemistry and Biochemistry & Department of Electrical and Computer Engineering (Biomedical Engineering), Old Dominion University, USA

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.

## Biography

Dr. X. Nancy Xu is an elected AAAS Fellow and Professor of Biomedical Engineering, Biomedical Sciences, Biochemistry and Chemistry at Old Dominion University in USA. She has built a state-of-the-art interdisciplinary research laboratory and successfully developed a nationally and internationally recognized and well-funded interdisciplinary research program at the intersection of chemistry, biology, engineering and medicine. Dr. Xu has pioneered the development of a suite of highly innovative nano photonics tools for biomedical applications and she is especially well recognized for her pioneering work in single nanoparticle optics, nano optical biosensors, single molecule detection and single live cell imaging.

Dr. Xu has received several prestigious national awards, including Tech Briefs' Nano50 Innovator Award and Nano50 Technology Award, NSF BRAIN Initiative EAGER Award, Finalist of NIH Follow That Cell Challenge, ACS Roland F. Hirsch Award and AAAS Mentor Award. Dr. Xu was elected as an AAAS Fellow for her distinguished contributions to the fields of nanobiotechnology and ultrasensitive bioanalysis, including single nanoparticle optics, nano biosensors, single molecule detection and single living cell imaging. Dr. Xu has also received several university distinguished awards, including Distinguished Research Award and Faculty Research Achievement Award and multiple student-nominated awards. Her profile is at www.odu.edu/~xhxu.

# Location-aware ingestible microdevices for wireless monitoring of gastrointestinal dynamics

**Saransh Sharma**

Department of Electrical Engineering, California Institute of Technology, USA

Localization and tracking of ingestible microdevices in the gastrointestinal (GI) tract is valuable for the diagnosis and treatment of GI disorders. Such systems require a large field-of-view of tracking, high spatiotemporal resolution, wirelessly operated microdevices and a non-obstructive field generator that is safe to use in practical settings. However, the capabilities of current systems remain limited. Here, we report three dimensional (3D) localization and tracking of wireless ingestible microdevices in the GI tract of large animals in real time and with millimetre-scale resolution. This is achieved by generating 3D magnetic field gradients in the GI field-of-view using high-efficiency planar electromagnetic coils that encode each spatial point with a distinct magnetic field magnitude. The field magnitude is measured and transmitted by the miniaturized, low-power and wireless microdevices to decode their location as they travel through the GI tract. This system could be useful for quantitative assessment of the GI transit-time, precision targeting of therapeutic interventions and minimally invasive procedures.

## Biography

Saransh Sharma received the B.Tech. degree in Electronics and Electrical Communication Engineering from IIT Kharagpur, India, in 2017 and the M.S. and Ph.D. degree in Electrical Engineering from Caltech, Pasadena, CA, USA, in 2018 and 2023 respectively. He is currently a post-doctoral scholar at MIT, Cambridge, MA, USA. His research is on integrated circuits and systems design, with special emphasis on low-power biomedical applications. He was a recipient of the Demetriades-Tsafka-Kokkalis award for best PhD thesis at Caltech in biotechnology and related fields, the Jakob van Zyl Predoctoral Research award at Caltech, Lewis Winner Award for Outstanding Paper at ISSCC 2024, Charles Lee Powell Fellowship at Caltech and Excellence in Mentorship award at Caltech for mentoring undergraduate and graduate research students.

# Regulation of mTOR by phosphatidic acid

**Maria A. Frias**[1] and **David A. Foster**[2]

[1]Department of Biology, St. Francis College, USA
[2]Department of Biological Sciences, Hunter College CUNY, USA

mTORC1, the mammalian target of rapamycin complex 1, is a key regulator of cellular physiology. The lipid metabolite phosphatidic acid (PA) binds to and activates mTORC1 in response to nutrients and growth factors. After reviewing structural findings, we propose a model for PA activation of mTORC1. PA binds a highly conserved sequence on α4 helix of the FKBP12-rapamycin binding domain of mTOR. It is proposed that PA binding to two adjacent positively charged amino acids breaks and shortens the C-terminal region of α4-helix. This leads to profound consequences for substrate binding and catalytic activity of mTORC1.

## Biography

Dr. Frias was a visiting graduate student in the laboratory of Dr. David Sabatini, at the Whitehead Institute for Biomedical Research. She received her PhD in Biomedical Sciences by the University of Lisbon in 2008. She then moved to New York City to pursue postdoctoral studies at the Rockefeller University and Hunter College – CUNY. Dr. Frias is an Assistant Professor of Biology at St. Francis College, where she keeps collaborating with her former postdoctoral mentor Prof. David Foster.

# Prospective evaluation of the hill model in nanomaterials' bioassays

**Paulo Cesar De Morais**

Catholic University of Brasilia, Brazil

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.

## Biography

Professor Paulo César De Morais, PhD, was full Professor of Physics at the University of Brasilia (UnB) – Brazil up to 2013. He appointed as UnB's (Brazil) Emeritus Professor (2014) and visiting Professor at the Huazhong University of Science and Technology (HUST) – China (2012-2015). He is distinguished Professor at the Anhui University (AHU) – China (2016-2019); and he is Full Professor at the Catholic University of Brasília (CUB) – Brazil (2018); CNPq-1A Research Fellow since 2010; 2007 Master Research Prize from UnB. He held two-years (1987-1988) post-doc position with Bell Communications Research, New Jersey – USA and received his Doctoral degree in Solid State Physics (1986) from the Federal University of Minas Gerais (UFMG) – Brazil. With more than 12,000 citations. He has published about 500 papers (Web of Science) and more than 15 patents.

# Stress-induced increase in left ventricle diastolic pressure

**Regina Celia Spadari, Luana Silva Rodrigues** and **Ana Elisa TS de Carvalho**

Department of Biosciences, Federal University of Sao Paulo (UNIFESP), Brazil

Cardiac output and blood pressure are regulated in the short-term by the autonomic nervous system in order to cope with everyday situations. The catecholamines released by the sympathetic nervous system-adrenal medulla bind to and activate cell surface α- and β-adrenoceptors being both expressed in rodent and human hearts. Stress induces transient additional increases in sympathetic activity and β-adrenoceptors activation. Chronic or repeated exposure to high catecholamines levels, however, may lead to response desensitization and alterations in components of the intracellular signaling pathways. Those stress-induced molecular alterations correlate with some heart dysfunction. In rats submitted to the foot shock stress paradigm (1 daily session, pulses of 1mA, 1s, 5-25s intervals between pulses, 30 min duration, 3 days), hemodynamic parameters were evaluated 24h after the third stress session using a catheter inserted in the left ventricle. The left ventricle diastolic pressure and the left ventricle end diastolic pressure were higher than those seen in control rats, what characterizes diastolic dysfunction. Heart rate, systolic pressure, speed of contraction and relaxation and heart rate variability were not altered by stress. Fibrillation and death occurred in stressed rats following afterload increase caused by phenylephrine i.v. administration. It is concluded that stress may cause alterations in the heart performance probably due to impaired ventricle relaxation and myocardium complacence that may cause fibrillation and death.

## Biography

Full Professor at Federal University of Sao Paulo. Her research interest is the Stress Biology focusing the effects of stress on the adrenergic signaling in the heart of animal models of stress. The Stress Biology team also investigate stress biomarkers, mostly salivary cortisol under several conditions. They had published 74 papers, supervised 37 master degree's thesis and 17 PhD thesis.

# Nylon nanofibres as an antibody immobilisation surface in a biosensor device: Study of their reusability and stability

**Inés Peraile, Paloma Lorenzo-Lozano, Laura González-López, Nushin A. Dabbagh-Escalante, Juan C. Cabria-Ramos** and **Matilde Gil-García**

National Institute for Aerospace Technology "Esteban Terradas" (INTA)-Campus La Marañosa, Spain

The use of biological agents is a widespread security concern. Therefore, the development of early detection and identification systems for biological agents, lab-on-a-chip (LOC) devices, which are specific, sensitive, miniaturisable, easy to use and low cost, has become a priority objective. Immunodetection provides the required speed and specificity. In the design of these immunological devices, the antibody immobilisation surface is crucial. Nylon nanofibres have been described as a very good choice because they allow an increase in the surface-to-volume ratio, leading to an increase in immunocapture efficiency. In addition to the need for a fast and specific detection system, stability and reusability of the immunocapture system are important features to make the system more efficient and cost effective. Our research team has conducted recently published studies to evaluate the cost-effectiveness of nylon nanofibres (DOI: 10.3762/bjnano.8.130). On the one hand, the reuse of nanofibres was investigated using different stripping treatments on nylon nanofibres, based on different pH values. Our study shows that stripping with glycine buffer, pH 2.5, allows the nanofibres to be reused as long as the protein A/G is previously anchored, leaving both the nanofibre and the protein A/G unchanged and reusable. On the other hand, we investigated the stability of nylon nanofibres over several months and found that these nylon nanofibres retained their immunocapture ability unchanged for longer than a specialised planar surface. In conclusion, nylon nanofibres appear to be a very good choice as an antibody immobilisation surface, as they not only offer higher immunocapture efficiency, but are also more cost effective as they are reusable and stable.

## Biography

Inés Peraile Muñoz has a degree in Biology and a PhD in Pharmacology and Human Therapeutics from the Faculty of Medicine of the Complutense University of Madrid. During this period she participated in 5

PEERS ALLEY MEDIA

PEERS ALLEY MEDIA

2nd Global Conclave on

# Future of Biosensors and Bioelectronics

2nd Euro-Global Summit on

# Advances in Structural Biology and Protein Chemistry

June 2025 | London, UK

PEERS ALLEY MEDIA

ACCEPTED ABSTRACTS

*Joint Event*

# Future of Biosensors and Bioelectronics

&

# Advances in Structural Biology and Protein Chemistry

**June 21, 2024**

FUTURE OF BSBE 2024 &
ADV. STRUCTURAL BIO 2024

# Expansivity measurements made using capacitance dilatometers between 2K and 873K

**Thomas L. Altshuler**

*Former owner of the Advanced Materials Laboratory, Inc. USA*

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.

## Biography

Thomas L. Altshuler is currently an engineering consultant. He was the president and owner of the Advanced Materials Laboratory, Inc. His specialties include physical and mechanical metallurgy and creative engineering. He is experienced in engineering, basic research, and teaching. His contributions have been in the fields of Scanning Probe Microscopy (nanotechnology), mechanical and physical testing of composites and other materials from 2 to 900 degrees Kelvin, superconductivity, dislocations, infrared engineering. He invented medical devices (Hemotensiometer - IR 100 award, the top 1% of new products manufactured worldwide in 1973), and created a computer program for fatigue design sold by ASM International. He was a Visiting Full Professor at Northeastern University. He has five patents, five additional patent disclosures, and thirty three publications. He received a Doctor of Philosophy (DPhil) from Oxford University followed by post-doctoral at the University of Pennsylvania He has been elected as a Fellow ASM International (2002).

# A CRISPR-cas system-based metal-enhanced light-up aptamer fluorescence biosensor for profiling exosome-associated breast cancer

**Jiaxiang YAN and Mo YANG**

*Department of Biomedical Engineering, The Hong Kong Polytechnic University, China*

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.

# State of the art review on automatic sorting system for industrial robots using Internet of Robotic

**Thierno Gueye**

*Department of Industry Engineering, School of Industrial Engineering, Northwestern, Polytechnical University, China*

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.

# An innovative prosopis cineraria pod aqueous waste as natural inhibitor for enhancing unsaturated lipids production in yeast cell using banana peel

**Prashant Kumar[1], Shivani Chaturvedi[4], Prasanta Kumar Rout[2,3], Selvakannan Periyasami[1], Suresh Bhargava[1]** and **Ylias Sabri[1]**

*[1]Centre for Advance Materials and Industrial Chemistry (CAMIC), School of Science, RMIT University, Australia*
*[2]Phytochemistry Division, CSIR-Central Institute of Medicinal and Aromatic Plants, Uttar Pradesh*
*[3]Academy of Scientific and Innovative Research (AcSIR), India*
*[4]Indian Institute of Technology, India*

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-$CO_2$. This liquid-$CO_2$ 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.

- Novel enantioselective catalyst system (Zn/Cr-SA-SC) and synthesis of mosquito repellant compound (+)-PMD from lemongrass essential oil. (159NF2022)
- Purification of methyl ester/ricinoleic acid (castor oil) and its Biotransformation to γ-Decalactone" (0147NF2019)

**Biography**

Research scholar at RMIT University, Australia, and his expertise lies in the field is Synthesis of heterogeneous catalysts, Mesoporous materials, mixed oxide materials, Nano Materials, MOF synthesis, kinetic studies, Application study of materials in hydrogenation, oxidation, and cyclization process, conversion of waste biomass into valuable products, $CO_2$ capturing and transformation and biosensing.

# Cataract eye detection by optik image analysis using encoder basis Boltzmann architecture integrated with internet of things and data mining

**Faheem Ahmad Reegu**

*Jazan University, Saudi Arabia*

As cataracts are the most common cause of blindness and are responsible for more than half of all occurrences of blindness worldwide, early detection is crucial. It is now recognized that childhood cataract, which was once common among the elderly, is a significant cause of infant and young child blindness and severe visual impairment. The objective of this paper is to develop a machine learning-based optic image-based cataract detection system. The public health dataset has been used to collect the data in this case using the internet of things module. The auto region encoder basis Boltzmann architecture has been used to pre-process and pre-train this data for improved data classification. The detection was carried out using this pre-trained data, and when an image showed signs of cataract in the eye, it was classified using auto region encoder basis Boltzmann architecture. The simulation results show that various optical-based cataract image datasets have the best accuracy, precision, recall, F-1 score, and specificity.

**Biography**

Faheem Ahmad Reegu received his bachelor's and master's degree in computer science from Kashmir University in 2010 and 2013, respectively. He was working as senior lecturer in department of computer science, Jazan University, Jazan, and KSA. Currently, he is a PhD candidate in Advance informatics Department from Razzak faculty of Technology and informatics, Universiti Technologi Malaysia (UTM) Kuala Lumpur. His research Domains are Blockchain, IoT and Machine Learning.

# Decoherence and relaxation time of magnetopolaron in the presence of three-dimensional impurity under strong parabolic potential

**Donfack Bernard**

*University of Dschang, Cameroon*

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 $\tau r$ exhibits increasing behavior as a function of, $\alpha$, $\beta$, and $\omega c$. 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.

## Biography

Dr. Donfack bernard working in condensed mater and nanophysics at the university of Dschang Cameroon, holder of two masters obtained respectively at the university of Dschang Cameroon and university of Lorraine in France at the age of 28. He has attended many conferences and webinars, a reviewer of three reputed journals. I'm an engineering science teacher since 2018, now the author of 5 publications in reputed journals.

# Navigating SARS-CoV-2 transmission: Detection and adsorption perspectives

**D. Dobrynin, I. Polischuk, L. Portal, I. Zlotver, A. Sosnik** and **B. Pokroy**

*Technion – Israel Institute of Technology, Israel*

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.

## Biography

In 2021, Daniela Dobrynin proudly completed her undergraduate studies in the interdisciplinary fields of materials engineering and biology within the Department of Materials Science and Engineering at the Technion-Israel Institute of Technology. Eager to delve deeper into materials science, she pursued an M.Sc. in the same department. By the end of 2022, Daniela transitioned to the Ph.D. direct track program, and nowadays, she is finishing her first year as a Ph.D. candidate.

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

**M. Fahland** and **R. Mishra**

*Fraunhofer Project Centre for Embedded Bioanalytical Systems, Dublin City University, Ireland*

The generation of droplets in microfluidic 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 flow control-based methods that employ cross flowing, flow-focusing or co-flowing microfluidic 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 effect of several parameters on the size and rate of droplet formation. Although several such models have been presented previously for pump-driven cross- flowing, flow focusing or co-flowing architectures, systems typically employing centrifugal actuation methods are limited. We investigate here a CFD method for modeling and simulating step- emulsification of water-in-oil, on a centrifugal microfluidics platform. The effects of contact angles, supply channel geometry, and capillary number were studied using the numerical model and compared to experimental data from previous work.

**Biography**

2022 – Today

- Technical University Berlin MSc Engineering Science
- Scholarship holder at the Friedrich-Naumann-Foundation for Freedom
- Focus on Thermodynamics und Fluid Mechanics

2021 – 2022

- Fraunhofer Project Centre for Embedded Bioanalytical Systems (FPC@DCU) Dublin
- Research Assistant
- Development and evaluation of CFD simulations for microfluidic processes

2018 – 2021

- Technical University Berlin BSc Engineering Science
- Grade 1,8
- Focus on Fluid Mechanics

# A Comparative reconnaissance review on cybersecurity and ethical considerations in bioelectronics

**Maitri Patel**[1], **Parita Shah**[2] and **Alpa Oza**[3]

[1]*Institute of Advanced Research, India*
[2]*Vidush Somany Institute of Technology and Research, Kadi Sarva Vishwavidyalaya, Sarva Vidyalaya Kelavani Mandal Kadi, India*
[3]*SAL College of Engineering, India*

The integration of bioelectronics into healthcare marks a pivotal transformation, highlighting significant challenges in cybersecurity and ethical deliberations. This review systematically explores the imperative of strengthening bioelectronic technologies while delving into the ethical complexities intertwined within this domain. At the core of this analysis lies the identification and mitigation of looming cyber threats affecting bioelectronic systems. A meticulous examination of vulnerabilities and associated risks emphasizes the critical need for implementing robust safeguards to protect sensitive biological data's integrity and confidentiality. Furthermore, this review scrutinizes the inherent ethical dimensions of bioelectronics, elucidating concerns encompassing informed consent, data ownership, privacy preservation, and ensuring fair access. By synthesizing these crucial aspects, this paper provides a comprehensive exploration of the intricate interplay between cybersecurity and ethics within the realm of bioelectronics. It advocates for the development of comprehensive frameworks that not only fortify technological advancements against cyber threats but also uphold ethical responsibilities. Drawing insights from a diverse range of scholarly sources and industry perspectives, this comparative reconnaissance review offers a synthesized understanding of imperatives governing security and ethical considerations in the burgeoning sphere of bioelectronics. Ultimately, it underscores the necessity for holistic approaches that harmonize technological innovation with ethical principles, fostering a secure and ethically inclined landscape for the future of health tech in bioelectronics.

## Biography

### Dr. Maitri Patel

Dr. Maitri Patel is working as an Associate Professor in the Department of Computer Sciences and Engineering at Institute of Advanced Research (IAR), Gandhinagar, India. She has 6+ years of research and 13 years of academic experience in the field of Computer Science and Engineering and is also associated with the IT industry. She did her Ph.D. in Computer Engineering in the network security domain from SP University, Visnagar, India. She has published/presented papers in international/national journals and conferences. She has served as a reviewer in international journals and conferences.

Also, she delivered an expert session for class 1 and 2 RFOs and acted as session chair in international conferences. Her main area of interest is network security and IoT and its applications.

**Dr. Parita Shah**

Dr. Parita shah is working as an Assistant Professor at Vidush Somany Institute of Technology and Research, a distinguished constituent institute of Kadi Sarva Vishwavidyalaya Gandhinagar, operating under the esteemed Sarva Vidyalaya Kelavani Mandal Kadi, renowned for its rich, century-old legacy in academic philanthropy. With over nine years of dedicated teaching experience, she obtained her Ph.D. in Information Technology from Parul University, Vadodara. Her doctoral research predominantly focused on Natural Language Processing, exploring its intricate domains and applications. Her area of interest is NLP and text classification. She has published/presented papers in international/ national journals and conferences. She has served as a reviewer in international journals and conferences.

**Ms. Alpa OZa**

Ms. Alpa Oza, is currently working as an Assistant Professor in the Department of Information Technology at SAL College of Engineering. She has done her Bachelor of Engineering and Master of Engineering Information Technology. She has 09+ years of academic experience. She has guided 40+ projects of undergraduate students. She has published two research papers in peer reviewed international journals and one international book chapter. Under her mentorship two teams have won Smart India Hackathon 2019 at IIT- Kanpur and Gujarat Industrial Hackathon 2019 hosted PDPU, Gandhinagar. She has organized and hosted several STTPs, Seminars, Webinars and International Conferences sponsored by funding agencies like GUJCOST, DST, GTU, SSIP and SU. Her area of interest is AI, ML, Android Programming and IoT. She served as a Jury Member / Evaluator for State level NCSC- 2022 & NCSC-2023, and for National level NCSC-2022 held at Science City and SAL Education Campus, Ahmedabad, Gujarat.

# A health data analytics maturity model for hospitals information systems

**Álvaro Rocha**[1] and **João Vidal de Carvalho**[2]

[1]*ISEG, University of Lisbon, Portugal*
[2]*ISCAP, Polytechnic of Porto, Portugal*

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 ata 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.

## Biography

Álvaro Rocha holds the title of Honorary Professor, and holds a D.Sc. in Information Science, Ph.D. in Information Systems and Technologies, M.Sc. in Information Management, and BCs in Computer Science. He is a Professor of Information Systems at the University of Lisbon - ISEG, researcher at the ADVANCE (the ISEG Centre for Advanced Research in Management), and a collaborator researcher at both LIACC (Laboratory of Artificial Intelligence and Computer Science) and CINTESIS (Center for Research in Health Technologies and Information Systems). His main research interests are maturity models, information systems quality, online service quality, requirements engineering, intelligent information systems, e-Government, e-Health, and information technology in education. He is also Vice-Chair of the IEEE Portugal Section Systems, Man, and Cybernetics Society Chapter, and Founder and Editor-in-Chief of both following Scopus and/or WoS journals: JISEM (Journal of Information Systems Engineering & Management) and RISTI (Revista Ibérica de Sistemas e Tecnologias de Informação / Iberian Journal of Information Systems and Technologies). Moreover, he has served as a Vice-Chair of Experts for the European Commission's Horizon 2020 Program, and as an Expert at the COST - intergovernmental framework for European Cooperation in Science and Technology, at the European Commission's Horizon Europe Program, at the Government of Italy's Ministry of Universities and Research, at the Government of Latvia's Ministry of Finance, at the Government of Mexico's National Council of Science and Technology, at the Government of Polish's National Science Centre, and at the Government of Cyprus's Research and Innovation Foundation.

He has 342 of his publications indexed in Scopus database, having an H-Index = 26 and 2629 citations. In Google Scholar he has an H5-Index = 36, having 5995 citations. He has 204 of his publications indexed in the Web of Science database (Core Collection), having an H-Index = 20 and 1433 citations. And in ResearchGate he has an H-Index = 30 and 4162 citations, being part of the group of the 2% best scientists in the world, considering all areas of research, and part of the group of the 1% best scientists in the world, considering only his area of research: Information Systems.

# Comprehensive investigation of Stress-Strain distributions for predicting femur fracture risk: Finite element analysis and age-related variations

**Rahul A. Gujar[1], Kirtibala V. Shinde[2]** and **Victor Hugo C. de Albuquerque[3]**

*[1]Pimpri Chinchwad College of Engineering, India*
*[2]ValueDX Technologies, India*
*[3]Federal University of Ceará, Brazil*

This study endeavors to comprehensively investigate the stress-strain distributions in order to predict the fracture risk of the femur bone utilizing advanced finite element analysis. Employing state-of-the-art techniques, a meticulously constructed 3D model of the femur bone was generated from high-resolution computed tomography image data, utilizing the cutting-edge capabilities of Simpleware ScanIP software. This sophisticated femur bone 3D model, incorporating realistic heterogeneous material properties, was further subjected to rigorous analysis utilizing the powerful Altair HyperMesh software. The investigation involved the application of boundary conditions, subjecting the femur head to an incremental compression loading, ranging from 1000 N to 8000 N, at selected inclinations of 0°, 8°, and 15°, as elegantly depicted in Figure 1. The ensuing analysis evaluated the von Mises stress and strain distributions for each distinct tilting condition, thereby successfully finding the precise scenarios exhibiting the highest risk of femur fracture. Importantly, a comprehensive selection of eighteen human femur bone samples was employed, expertly classified into four distinct age groups: 21-35 years, 36-50 years, 51-65 years, and 66 years and above. Subsequently, meticulous finite element analyses were judiciously performed, assessing the influence of age, bone tilt, and compressive load on the fracture risk of the femur bone. The comprehensive study successfully unveiled that the von Mises stress and strain distributions exhibited notable variations, intrinsically linked to the age of the subjects, the tilting of the bone, and the magnitude of the applied loading. Strikingly, the highest risk of fracture was consistently observed at a higher inclination under identical loading conditions across all age groups. Furthermore, the analysis revealed a pronounced trend, with individuals belonging to the higher age groups exhibiting the maximum fracture risk, emphasizing the critical role of age in determining susceptibility to femur fractures.

These groundbreaking findings possess profound implications for the realm of clinical practice, as they offer immense potential in terms of fracture risk prediction and the formulation of personalized treatment strategies. By diligently considering subject-specific factors and harnessing the full potential of advanced computational techniques, healthcare professionals

can significantly augment their ability to identify individuals at heightened risk of fractures and, in turn, expertly implement tailored preventive measures. This study represents a significant leap forward in our understanding of femur fracture risk assessment, paving the way for enhanced clinical decision-making and improved patient outcomes.

**Biography**

Dr. Rahul A. Gujar is an accomplished academician at PCCoE, Savitribai Phule Pune University. Born on May 13th, he earned his PhD from Dr. Babasaheb Ambedkar Technological State Govt. University, India and he is currently a Postdoctoral Research Fellow at the Federal University of Ceara, Brazil. Boasting over 15 years of expertise in research and academics, he specializes in the Biomedical and Mechatronics fields. Driven by a passion for interdisciplinary research in biomedical and biomechanics, he has led distinguished achievements and spearheaded various research and industrial projects. Embracing challenges, Dr. Gujar constantly seeks opportunities for professional and personal growth. As a dedicated innovator, his overarching goal is to contribute significantly to the research community, making a positive impact on the realm of biomedical research.

# Opportunities for food waste revalorization: Bioactive potential of crude extracts from waste biomass from tropical highland fruit crops

**Laura A. Calvo-Castro[1], Andrea Irías-Mata[2], Karla Salas-Arias[1]** and **Carolina Centeno-Cerdas[1]**

*[1]Centro de Investigación en Biotecnología, Instituto Tecnológico de Costa Rica, Costa Rica*
*[2]Centro para Investigaciones en Granos y Semillas, Universidad de Costa Rica, Costa Rica*

Tropical highland Costa Rican fruits (apple, plum, and strawberry) have shown high total polyphenol content, relevant antioxidant activity, and cytotoxic effects against human cancer cell lines. However, the vegetative part of the plants is usually discarded, representing presumably large sources of underutilized bioactive biomass. We prepared crude extracts from Costa Rican fruits, using waste material from the crops and employing food-grade solvents and simple techniques, aiming towards easy translation of the extraction protocols to small local producers. The extracts showed relatively high total polyphenol amounts, and exhibited cytotoxic activity against human breast, lung, liver, prostate, or skin cancer cells; possible photoprotective effects against UV damage in skin cells *in vitro*; and inhibition of cell proliferation in the scratch-wound-healing assay. The fruit extracts were also successfully emulsified into thermodynamically stable polysorbate-based micelles, with potential applications in food and biomedical industries. We also evaluated the effect of elicitor treatments on polyphenol production in strawberry leaves in plants grown in greenhouse conditions and *in vitro*, resulting in higher amounts and faster accumulation of polyphenols in the *in vitro* regenerated plants. The easy-to-implement extraction protocols and biochemical tests could provide a relevant source of bioactive phytochemicals which may be incorporated into environmentally friendlier product design.

## Biography

Prof. Dr. rer. nat. Laura A. Calvo-Castro obtained a Biotechnology Engineering degree at Costa Institute of Technology (ITCR), followed by a Master's degree in Microbiology (University of Costa Rica), and a Doctorate in Natural Sciences at University of Hohenheim in Germany. She is a professor in the Biotechnology Engineering Program of the School of Biology at ITCR since 2008, and current Coordinator (since 2019) of the Biotechnology Research Center (CIB-ITCR). Dr. Calvo-Castro main area of expertise is in tissue engineering of human epithelia as *in vitro* model for testing cell viability, cytotoxicity, permeability and bioactivity of plant-derived extracts and substances. She is also interested in employing agro-industrial waste materials to develop environmentally friendlier skin-care products, aiming towards effective translation of the protocols into circular economies with small local producers.

# Long-term clearance and biodistribution of magnetic nanoparticles assessed by AC Biosusceptometry

**Erick G. Stoppa[1], Guilherme A. Soares[1], Andris F. Bakuzis[2], Oswaldo Baffa[3]** and **José R. Miranda[1]**

*[1]Department of Biophysics and Pharmacology, Institute of Biosciences, São Paulo State University—UNESP, Brazil*
*[2]Institute of Physics, Federal University of Goiás, Brazil*
*[3]Faculty of Philosophy, Sciences and Letters at Ribeirão Preto, University of São Paulo, Brazil*

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 $MnFe_2O4$ 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.

## Biography

Graduated in Medical Physics from the educational institution Universidade Estadual Paulista "Júlio de Mesquita Filho" UNESP - IBB, Botucatu, Brazil 2016 to 06/2021. Master in Pharmacology and Biotechnology from the educational institution Universidade Estadual Paulista. He has experience in the areas of Medical Physics, Biomedical Engineering, Animal Experimentation, Ability to plan and optimize experimental protocols, Acquisition of biological signals, Processing of biological signals and images (Python, Matlab, Labview and Origin), Statistical data analysis. Currently he is studying for a PhD at the Universidade Estadual Paulista "Júlio de Mesquita Filho" in the "Biomolecular and Pharmacological Sciences" program in the Area of concentration: Biomolecular Physics with an emphasis on Experimental Biophysics and Biomedical processes - at the Institute of Biosciences of Botucatu IBB, where he is CNPq scholarship holder.

# EEG changes in intensive care patients diagnosed with COVID-19: A prospective clinical study

**Javid Shafiyev**[2] and **Omer Karadas**[1]

[1]*University of Health Sciences Gulhane Faculty of Medicine Department of Neurology, Turkey*
[2]*Gulhane Training and Research Hospital Neurology Clinic, Turkey*

**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.

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

**Nabeela Ameer[1], Muhammad Hanif[1], Hina Akram[1]** and **Khalid Mahmood[2]**

*[1]Department of Pharmaceutics, Faculty of Pharmacy, Bahauddin Zakariya University Multan, Pakistan*
*[2]Institute of Chemical Science, Bahauddin Zakariya University Multan, Pakistan*

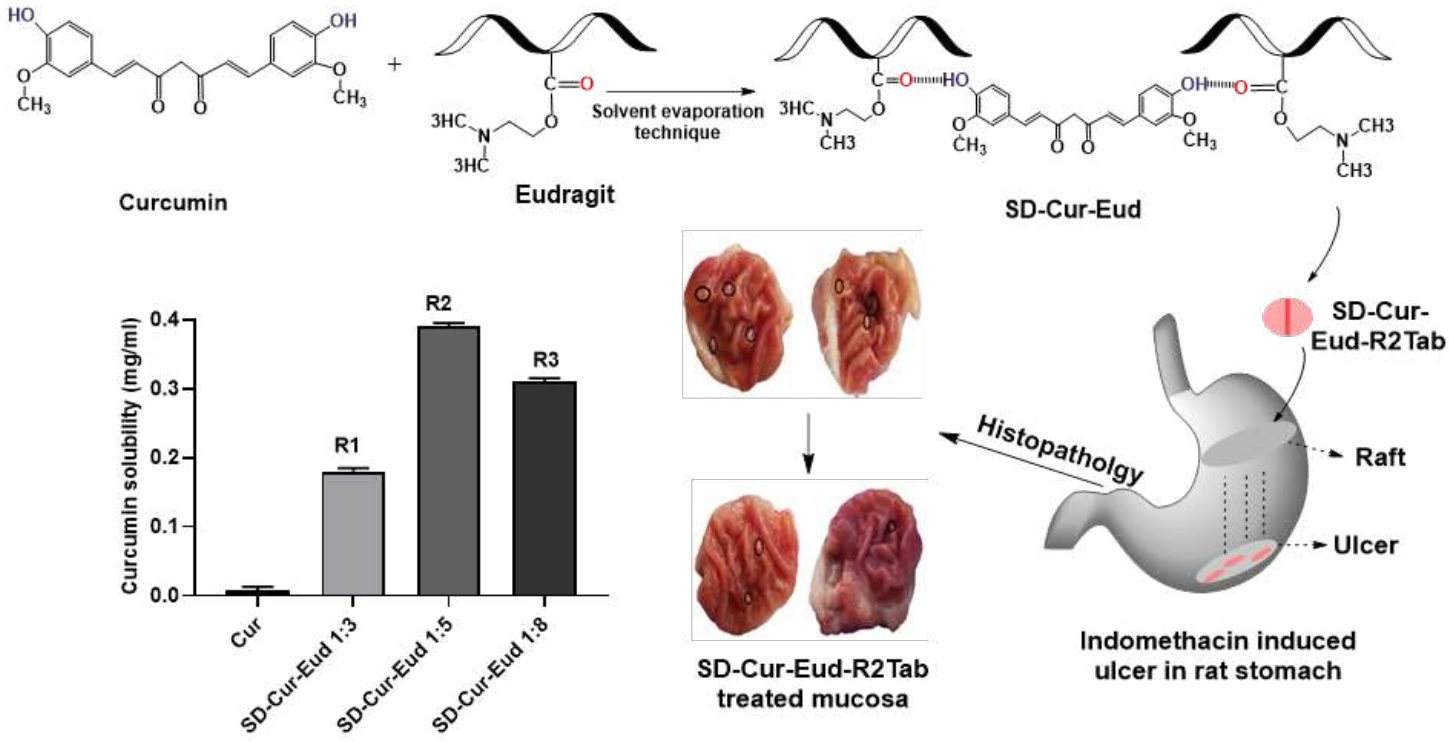
**Purpose:** Most common complications of the gastric ulcer are hemorrhage, perforation, ulcer penetration into adjacent organs, and gastric outlet obstruction which can be fatal if untreated. The present study aimed to improve gastric ulcer complications by using naturally occurring compound curcumin (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®.

**Conclusion:** SD-Cur-Eud2-RT may be considered an alternative of already available proton pump inhibitors for the treatment of gastric ulcers with minimum side effects.

## Graphical Abstract:




## Biography

Dr. Nabeela Ameer serving as an Assistant Professor at a distinguished Multan University of Science and Technology, Pakistan. Her journey in academia began with a solid educational foundation, culminating in advanced degrees in Pharmaceutics. She completed her Ph. D in Pharmaceutics from Bahauddin Zakariya University, Multan, Pakistan by achieving Higher Education Commission (HEC) Indigenous Ph. D Scholarship. She has also participated in many National and International conferences as oral presenter. Her research endeavors have led to numerous publications and presentations, further establishing her as a thought leader in the field.

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

**Hamid Reza Shabani** and **Mohsen Kalantar**

*Iran University of Science and Technology, Iran*

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 infinite 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.

### Biography

He is a part of a professional team as a postdoctoral researcher at Aalborg University (AAU Energy). They are working on a large project called “Lighthouse” that has several industrial and academic partners. His major task is modeling and control of a grid-connected PV/Methanol plant as well as wind power in a Power-to-X project using weather data from Influx. In this project, they are involved with reactive power capability analysis, power quality analysis, and grid code compliance assessment, especially low voltage ride through (LVRT) for wind energy. In addition, he is proud to have practical experience in power system dynamics study and control projects, both academically and in collaboration with industrial consultants and stakeholders as a power system engineer and researcher.

# Temperature sensor with enhanced sensitivity across a broad temperature range utilizing a twin- core photonic crystal fiber

**Sonal Singh** and **Vishal Chaudhary**

*Department of Electronics and Communication Engineering, Delhi Technological University, India*

This article introduces a temperature sensing application employing twin-core photonic crystal fiber (TC-PCF). In the TC-PCF structure, two solid cores positioned in the cross-section and separated by a vertical elliptical air hole function as independent waveguides. The unique arrangement of circular and elliptical air holes in our proposed structure offers a distinct advantage, enabling high sensitivity compared to other existing structures. The sensor, characterized by high birefringence, operates on the principle of mode coupling between the two fiber cores. Practical implementation of this TC-PCF-based temperature sensor involves coupling one fiber core to a broadband source at the input end and the other fiber core to an optical spectrum analyzer at the output end. Utilizing the finite element method, we conducted simulations and quantitative analyses of the proposed TC- PCF temperature sensor. The numerical simulations demonstrate that the optimized 3cm-long TC-PCF sensor exhibits a remarkable temperature sensitivity of approximately 21.5 pm/°C across an extensive temperature sensing range from 0 to 1200 °C. Additionally, we investigated the influence of variations in air hole diameter on the sensitivity of the proposed model.

## Biography

Sonal Singh received her Ph. D degree in Electronics engineering from University of Petroleum & Energy Studies, Dehradun, India and M. Tech degree in Nanotechnology from Jamia Millia Islamia, Delhi, India. She is currently working as an Assistant Professor in the Department of Electronics and Communication Engineering, Delhi Technological University, Delhi, India. Her area of interest includes Photonic Crystal Fiber, Nanoelectronics/Nanotechnology, synthesis, characterization, applications including analog circuits, PEC and photocatalysis. She has published more than 20 papers in reputed international journals, conferences, research articles and book chapters.

# Assessment of the association of OCT3/4 with GLUT1 and CD105 in oral squamous cell carcinoma using dual immunohistochemistry

**Samira Derakhshan[1,2], Nazanin Mahdavi[1]** and **Ali Abdolrahmani[3]**

*[1]Department of Oral and Maxillofacial Pathology, School of Dentistry, Tehran University of Medical Sciences, Iran*
*[2]Cancer Preclinical Imaging Group, Preclinical Core Facility, Tehran University of Medical Sciences, Iran*
*[3]Dental Research Center, Dentistry Research Institute, School of Dentistry, Tehran University of Medical Sciences, North Kargar St, Iran*

**Background:** Oral squamous cell carcinoma (OSCC) is the most common cancer affecting the oral and maxillofacial region. This study aimed to investigate the role of cancer stem cells (CSCs) in angiogenesis and hypoxic response in OSCC. The lack of sufficient information about the correlation between the expression of CSC markers and angiogenesis in head and neck carcinomas, especially the oral squamous cell carcinoma (OSCC) encouraged us to further scrutinize this correlation in OSCC. To our knowledge, it is the first study to evaluate the expression of GLUT1 and CD105 as markers of hypoxia and angiogenesis in association with one CSC marker in OSCC via dual immunohistochemistry.

**Methods:** This retrospective observational study evaluated 56 cases of OSCC using dual immunohistochemistry. Octamer-binding transcription factor 3/4 (OCT3/4) marker was used to evaluate CSC activity. Glucose transporter1 (GLUT1) marker was used to evaluate the hypoxic response and angiogenesis, while endoglin (CD105) was used to evaluate the late stage of angiogenesis and blood vessel formation.

**Results:** Co-expression of OCT3/4 and GLUT1 was noted in 11 of 12 patients with grade III OSCC. However, we did not observe co-expression of these markers in 13 of 22 patients with grade I OSCC. Although we observed a significant correlation between co-expression of GLUT1 and OCT3/4 and tumor grade, there was no significant correlation between co-expression of OCT3/4 and CD105 and different grades of OSCC.

**Conclusions:** CSCs could play important roles in the initial stages of hypoxic response and angiogenesis. Our result reported that in higher grades of OSCC, GLUT1 as a first response to hypoxic situations might be a result of CSCs. Further studies are required to discover other biomarkers, their roles, and associated pathways of CSCs in OSCC.

## Biography

Education: 1. M.Sc : Oral and Maxillofacial Pathology, Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran, 2015. Thesis Title: OCT-4 is a good predictor biomarker for local recurrence in head and neck basal cell carcinoma. Supervisor: Dr. F. Baghai 2. DDS: Dentistry, Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran, 2011. Thesis Title: Conventional Versus Papanicolaou-Stained Cytobrush Biopsy in the Diagnosis of Oral Squamous Cell Carcinoma. Supervisor: Dr. M Sahebjamee & Dr. A Mansourian.

Executive Position: 1. Vice Head of Department for Educational Affairs, Tehran University of Medical Sciences, Faculty of Dentistry, department of Oral & Maxillofacial Pathology, 2018-present. 2. Vice Head of Department for Research Affairs Tehran University of Medical Sciences, Faculty of Dentistry, department of Oral & Maxillofacial Pathology, 2018-present. 3. Dental Mentoring Office, Tehran University of Medical Sciences, Faculty of Dentistry, 2000-2002.

# Environmental enteropathy and its association with water sanitation and hygiene in slum areas of Jimma town Ethiopia

**Rediet Regassa[1], Markos Duguma[2], Dessalegn Tamiru[1]** and **Tefera Belachew[1]**

*[1]Department of Nutrition and Dietetics, Faculty of Public Health, Institute of Health, Jimma University, Ethiopia*
*[2]Jimma University Laboratory of Drug Quality (JuLaDQ) and School of Pharmacy, Ethiopia*

**Background:** Environmental Enteropathy is an inflammatory condition of the gut that leads to intestinal barrier dysfunction. It is a common problem in resource-limited countries and results from exposure to larger quantities of fecal bacteria to poor personal hygiene and environmental sanitation. Due to poor intestinal permeability, there is a problem with absorption of nutrients, which in turn leads to growth faltering, poor cognitive development, and oral-vaccine failure. The aim of this study was to identify the children with an elevated lactulose to mannitol ratio (indicative of possible environmental enteropathy) and its association with water sanitation and hygiene in slum areas of Jimma Town so as to mitigate the problem of malnutrition in under-five children.

**Methods:** A community-based cross-sectional study was carried out from January to April 2021. A Lactulose mannitol test was performed to determine the prevalence of elevated lactulose to mannitol ratio (possibly environmental enteropathy) in children aged 12 to 59 months. A pretested questionnaire was used to collect data on water sanitation and hygiene (WASH) indicators and sociodemographic characteristics. A multivariable logistic regression analysis was used to isolate independent predictors for possible environmental enteropathy. All tests were two-sided and statistical significance was declared at P<0.05.

**Results:** The results of this study showed that 19.3% (95%CI: 14.8–23.7) of children had an increased lactulose to mannitol ratio (>0.15). On multivariable logistic regression analysis, the variables drinking water from unimproved water sources (AOR 3.741; 95%CI: 0.914– 15.310, p=0.048), unsafe coverage of water storage (AOR 0.363; 95%CI: 0.169–0.777, P=0.009), public latrine utilization (AOR 0.139 95%CI: 0.024–0.816, P=0.029) and hand washing less than 3 critical time of hand washing practices (AOR 4.369;95%CI: 1.411–13.524 P=0.011) were significantly associated with an increased in lactulose mannitol ratio (possible indicative of intestinal permeability/environmental enteropathy).

**Conclusion:** This study showed that one-fifth of under-five children in Jimma Town had an elevated lactulose to mannitol ratio (possibly environmental enteropathy). The WASH sectors

and other governmental organizations should give emphasis to areas with poor water sanitation and hygiene to mitigate the problem of environmental enteropathy and related consequences like growth faltering, poor cognitive development, and oral-vaccine failure in the study area.

**Biography**

Rediet Regassa is a Ph.D. candidate at Jimma University, Jimma, Ethiopia. She holds her Master's in public health and Master's in health informatics from Addis Ababa University, Addis Ababa, Ethiopia. She has been working as an instructor at Menelik Health Science College, as a researcher at Addis Ababa University, and as a lecturer at Selale University.

# Naïve Bayes: A Classical Approach for the epileptic seizures recognition

**Surita Maini** and **Sanjay Dhanka**

*SLIET, Longowal, India*

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.

**Biography**

Dr. Surita Maini is an acknowledged academician and researcher in the field of Instrumentation and Biomedical Engineering at Sant Longowal Institute of Engineering and Technology, Longowal, Sangrur, Punjab. At present she is Professor and Head of Department of Electrical and Instrumentation Engineering, and Vice Chairman "Instituter Innovation Cell" of SLIET Longowal, Punjab. She was a visiting professor at the University of Alberta, Canada. She has visited many renowned labs in different countries like Singapore, France, Spain, Taiwan, China and USA.

# The ameliorative effects of topical gemifloxacin alone or in combination with clobetasol propionate on imiquimod-induced model of psoriasis in mice

**Hayder Ridha Salman[1,3], Adeeb Ahmed Al-Zubaidy[2], Alaa Hamza Abbas[3]** and **Qassim A. Zigam[1]**

*[1]Department of Pharmacology, College of Pharmacy, Al- Mustaqbal University, Iraq*
*[2]Department of Pharmacology, College of Medicine, University of Warith Al-Anbiyaa, Iraq*
*[3]Department of Pharmacology, College of Medicine, Al-Nahrain University, Iraq*

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.

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

**Madhavi Rashmi[1], Shweta Kulshreshtha[2]** and **Tanuja Singh[1]**

[1]*Patliputra University, India*
[2]*Amity University, India*

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.

**Biography**

Dr. Madhavi Rashmi, she has done her PhD in Biotechnology, she is working as an Associate Professor in Vision classes Patna. Many research papers have been published in various peer reviewed and UGC CARE listed journals.

# Effect of bone marrow mesenchymal stem cells on a short term induced diabetic retinopathy in adult female albino rats

**Nema Soliman[1,2], Nahla Imbarak[1,2], Horeya Erfan Korayem[1]** and **Somaya Hosny[1,2]**

*[1]Department of Histology and Cell Biology, Faculty of Medicine, Suez Canal University, Egypt*
*[2]Center of Excellence in Molecular and Cellular Medicine, Faculty of Medicine, Suez Canal University, Egypt*

**Background:** Worldwide, diabetic retinopathy (DR) remains the leading cause of visual impairment that often leads to irreversible vision loss. Despite the screening programs and treatments, Dr. affects approximately 17.9% of type II diabetes patients in Egypt.

**Aim:** To assess the curative effect of intravitreally injected bone marrow mesenchymal stem cells on experimentally induced diabetic retinopathy. Methods Thirty adult female albino rats were randomized into 5 groups: group (I), received no treatment; group (II), received intravitreal injection of phosphate buffer saline; group (III), subjected to diabetes induction using intraperitoneal injection of streptozotocin; group (IV), received intravitreal injection of bone marrow mesenchymal stem cells (BM-MSCs); and group (V), received intravitreal injection of BM-MSCs post-diabetes induction. After 30 days, the right eyes were enucleated and prepared for histological stains (H&E and PTAH), histochemical stain (PAS), and immunohistochemical stains (anti-CD34, anti-caspase-3 active, and anti-fbronectin), and the left eyes of group (V) were prepared for PCR analysis.

**Results:** Group (V) revealed preserved retinal tissue integrity, and the cellular organization appeared nearly normal in comparison to control groups. Less gliosis was seen in group (V) in comparison to group (III). Morphometric analysis of group (V) revealed a statistically significant increase in retinal thickness and decrease of the optical density of CD34 and fbronectin immunoreaction compared to group (III). PCR results revealed that all recipient rats contain SRY-positive gene.

**Conclusion:** BM-MSCs significantly reduced neurovascular retinal degeneration and gliosis within treated animals. BMMSCs might be beneficial in preventing Dr. progression.

**Lay Summary:** Diabetic retinopathy remains the leading cause of visual impairment which could progress up to visual loss. Vaso-regenerative stem cell therapy could be an effective therapeutic approach to prevent progression of retinal nerve cell damage in patients with ischemic retinopathies including diabetic retinopathy. In the present study, we investigated the therapeutic effect of intravitreally injected BM-MSCs in a short-term experimentally

induced diabetic retinopathy. BM-MSCs could provide a partial curative effect on the retina through decreasing retinal nerve cell degeneration, microangiopathies, fibrosis, and gliosis. Further studies focusing on the quality and timing of stem cell injection in different diabetic retinopathy stages and effectiveness of cell therapy as well as the possible adverse effects are recommended.

# Correlation between the prevalence of sick-building syndrome and safe indoor air quality concept in private residential housing in Jordan

**Ghaida Freihat** and **Nabeel Al-kurdi**

*Department of Architecture Engineering, The University of Jordan, Jordan*

Indoor air quality (IAQ) and related health problems have witnessed remarkable attention recently. The prevalence of sick-building syndrome (SBS) is considered the most common health issue. This study conducted in the Al-Dahrieh neighbourhood in Jordan showed for the first time how indoor air quality (IAQ) factors affect the prevalence of sick-building syndrome among occupants in residential buildings. The study investigated the concentration levels of air pollutants and comfort parameters. Architectural and urban design configurations were collected through site observation. In addition, daily activities for occupants were gathered through an online questionnaire. All statistical and descriptive analyses of the data collected for this study were carried out by Spearman's rho correlation test (SPSS) and Excel 2016. It was done using two-tailed (2-tailed) tests and a 1% statistical significance level (<0.01); interestingly, all expected parameters checked using SPSS are acceptable according to the significant factor of <0.05. The research explored low air quality in the selected case studies and suggested simple mitigation strategies to reduce pollutants concentration in the buildings, such as natural ventilation and control of pollution from internal sources. Moreover, architects may take these findings to enhance neighbourhood and building design to achieve the goal of constructing healthier buildings.

# Advancing healthcare through digital twins: A multimodal approach with emphasis on explainability and LLM integration

**Suchit Patel** and **Manik Gupta**

*Department of CSIS, BITS-Pilani, India*

This presentation explores the transformative potential of digital twin technology within the healthcare domain, particularly focusing on its multimodal capabilities, explainability features, and integration with Large Language Models (LLM). Digital twins, virtual replicas of physical assets or systems, offer unprecedented opportunities for personalized medicine, predictive analytics, and treatment optimization. By incorporating diverse data modalities such as medical imaging, electronic health records, and wearable sensor data, healthcare practitioners can gain a holistic view of patients' health status and anticipate potential complications. Moreover, ensuring the explainability of digital twin models is crucial for fostering trust among clinicians and patients, enabling transparent decision-making processes and facilitating regulatory compliance. Leveraging LLM enhances the interpretability of complex medical data, enabling clinicians to extract actionable insights and refine treatment strategies. This presentation will delve into case studies and real-world applications where digital twin technology, supported by multimodality, explainability, and LLM integration, has demonstrated significant advancements in disease diagnosis, prognosis, and patient management.

**Biography**

Mr. Suchit Patel is a robotics and healthcare researcher, focusing on human-centered AI fusion. Currently pursuing a joint PhD program at BITS Pilani in Hyderabad and La Trobe University in Melbourne, his research revolves around the application of digital twins in healthcare, emphasizing multimodal data integration, explainability, and Large Language Model (LLM) synergy. With prior experience as an assistant professor at Jaipur's Poornima College of Engineering, he has expertise in computer vision in low-light conditions and locomotion dynamics of bipeds and prosthetic legs. His interdisciplinary background, combining biological and mechanical components in post-graduate coursework, significantly influences his research, driving innovation in precision medicine, patient care, and clinical decision support.).

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

**Mehdi Yazdizadeh[1], Ghasem Mohammadi-Nejad[2], Leila Fahmideh[3], Fatemeh Ebrahimi[2], Mahmood Solouki[1]** and **Babak Nakhoda[4]**

*[1]Department of Plant Breeding and Biotechnology, Faculty of Agriculture, University of Zabol, Iran*
*[2]Research & Technology Institute of Plant Production, Shahid-Bahonar University of Kerman, Iran*
*[3]Department of Plant Breeding and Biotechnology, Faculty of Agriculture, University of Zabol, Gorgan University of Agricultural Sciences and Natural Resources, Iran*
*[4]Department of Molecular Physiology, Agricultural Biotechnology Research Institute of Iran, Agricultural Research, Education and Extension Organization, Iran*

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.

# EPR and luminescence properties of $Mn^{2+}$ doped $BaCO_3$ nanoparticles synthesized by autocombustion method

**Brahim Abidine[1], Mondher Yahya[2]** and **Chaker Bouzidi[1]**

*[1]Laboratory of Useful Materials, National Institute of Research and Physicochemical Analysis, Tunisia*
*[2]Physical Chemistry Laboratory for Mineral Materials and Their Applications, National Center for Research in Materials Sciences, Tunisia*

Samples nanostructured powders of undoped and $Mn^{2+}$ doped $BaCO_3$ were prepared by the autocombustion method. The samples nanostructures were characterized by X-ray powder diffraction (XRD), Fourier Transform Infrared Spectroscopy (FTIR), Scanning Electron Microscopy (SEM), the Electron Paramagnetic Resonance (EPR) and Photoluminescence (PL). The XRD revealed that the samples consist of the $BaCO_3$ phase with orthorhombic structure having the space group Pmcn, retaining this crystalline phase after doping with $Mn^{2+}$. These products were found for undoped and $BaCO_3$: $Mn^{2+}$ nanoparticles with 64.2–70.5 nm and 41.7–44.9 nm ranges, respectively. SEM revealed that the barium carbonate nanoparticles had a spherical morphology. FTIR showed Symmetric and asymmetric stretches, and in plane bending vibrations and out of plane of $CO_3^{2-}$ complexes have detected. EPR indicate a paramagnetic behaviour for undoped and $Mn^{2+}$ doped $BaCO_3$. The photoluminescence of the obtained $BaCO_3$: $Mn^{2+}$ were studied. The CIE coordinates for the $Mn^{2+}$ doped $BaCO_3$ were x = 0.416 and y = 0.565. From the CIE chromaticity diagram for the emissions of $Mn^{2+}$ doped $BaCO_3$. The material has such color purity reaches 95%. Thus, having color tenability and has been considerate as a candidate of the laser emission.

# Comprehensive transcriptional, proteomic and *In Silico* profiling of 51 uncharacterized proteins in Vibrio cholerae unravels potential drug-target(S) and vaccine candidate(S) By reverse vaccinology

**Sritapa Basu Mallick[1], Sagarika Das[1,2], Aravind Venkatasubramanian[1], Saurabh Kundu[3]** and **Partha P. Datta[1]**

*[1]Department of Biological Sciences, Indian Institute of Science Education and Research Kolkata, India*
*[2]Department of Laboratory Medicine, Institute of Biomedicine, University of Gothenburg, Sweden*
*[3]Ramakrishna Mission and Vivekananda Educational and Research Institute, India*

Cholera is an extremely fatal, water-borne diarrheal disease which affects approximately around 1.3-4 million people every year and is still continuing to be a major global threat. It is caused by the intake of contaminated water infested with Gram-negative, pathogenic bacteria, *Vibrio cholerae*. Due to the significant upsurge of the persistent and Multidrug Resistant (MDR) strains of *V. cholerae*, new potential drug-targets and vaccine candidates are needed to be discovered and studied extensively to imbibe a better understanding of the bacterial pathogenesis. *Cgt*A, an essential Ribosome-associated GTPase protein, which is ubiquitously expressed in all bacteria, is a potential drug-target since it plays a monumental role in a plethora of cellular functions. Our recent works revealed that upon the knockdown of *cgt*A from the genome of *V. cholerae* and employing high-throughput techniques like transcriptional profiling by RNA-sequencing and label free proteomics, expression of a myriad of proteins are altered i.e., either upregulated or downregulated. Out of all the proteins whose expression patterns are altered upon knockdown of *cgtA*, several proteins are still unidentified and yet to be characterized. We have carried out a comprehensive *in-silico* analysis on these uncharacterized proteins whose size ranges from approximately 5kDa to 92KDa, which helped us to hypothesize and design *in vitro* and *in-vivo* experiments to characterize these proteins. Furthermore, we cloned, expressed, and purified few such novel proteins for validation purposes. Moreover, our transcriptomic, proteomic and *in-silico* analysis and results allowed us to screen the potential vaccine candidates and drug targets that will enhance our understanding of the cholera pathogenesis. This study will undoubtedly unfold new facets and avenues towards drug-discovery and put us a step forward towards novel therapeutic intervention against a deadly disease like Cholera.

## Biography

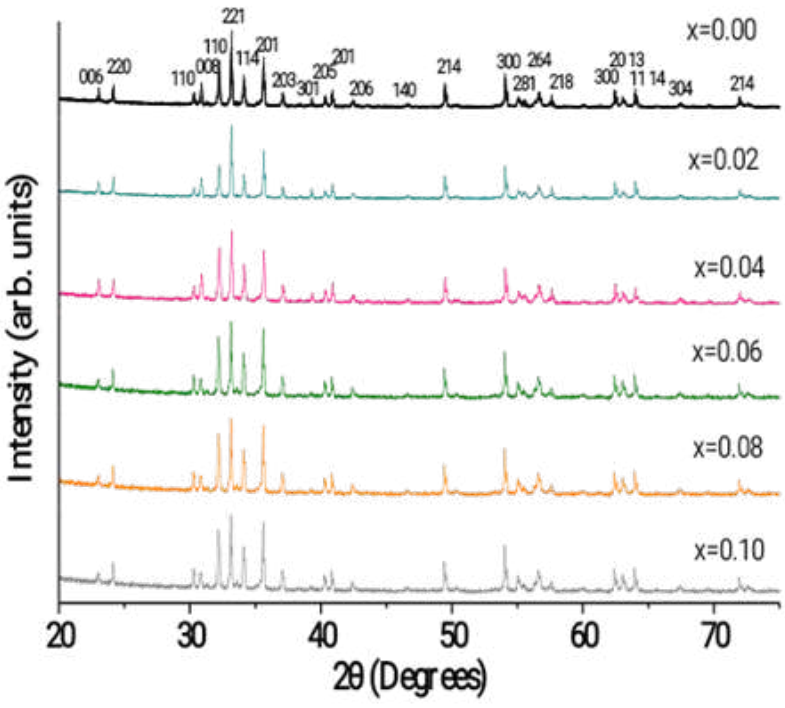
Sritapa Basu Mallick have completed her graduate degree on Biotechnology from St. Xavier's College, Kolkata, in 2019. She is currently a Senior Research Fellow under Department of Biotechnology (DBT) at Indian Institute of Science Education and Research (IISER), Kolkata. She has profound interest in the area of structural biology, computational biology and molecular biology, which is why, she is pursuing her PhD in a Structural and Molecular Biology Laboratory at Department of Biological Sciences in IISER, Kolkata. She actively works in the area of computational and molecular biology. Recently, she is working on an essential ribosome-associated GTPase, CgtA, which has multifarious roles like regulation of gene expression, stress-response, and antibiotic-resistance. However, the mechanism by which CgtA exercises its pleiotropic effect is still unknown. Sritapa's work aims to bridge the gap between the CgtA and its functions which will further help in drug discovery and novel therapeutic interventions against deadly disease of cholera.

# Enhanced structural and dielectric properties of InMn substituted M-type hexaferrites

**Hasan M. Khan**[1,2]

[1]*Institute of Physics, The Islamia University, Pakistan*
[2]*Centre of Excellence in Solid State Physics, University of The Punjab, Pakistan*

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.



## Biography

Dr. Hassan Mehmood Khan has completed his PhD at the age of 30 and is working as assistant professor at the Institute of Physics The Islamia University of Bahawalpur Pakistan The fields of interest include Condensed matter Physics. Magnetic Materials, Nanomaterials. (synthesis, characterization and their application studies), nanocrystalline soft ferrites, nanostructured hard ferrites. Microwave and other high frequency applications of Ferrites.).

# Sealing ability *in vitro* study and biocompatibility *in vivo* animal study of different bioceramic based sealers

**Tara H Haji[1], Bahar J. Selivany[2], Abdulhaq** and **A. Suliman[3,4]**

[1]*Kurdistan Board for Medical Specialist*
[2]*College of Dentistry/University of Duhok, Iraq*
[3]*Ajman University, College of Dentistry, Umited Arab Emirates*
[4]*Centre of Medical and Bio-allied Health Sciences Research, Ajman University*

**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.

## Biography

Tara Hasan was born on April 28,1989, in Mousl, Iraq. She is graduted from college of dentistry on 16/7/2012 at Hawler medical university/ Erbil, she was a research assistance for two years in duhok university /college of dentistry, then she gets her Master degree on 2015/5/12.

Then she accepted in PHD on 2017/8/16. I finished on 2022/11/10

She has 3 papers articles published in international journals.

# Effect of the subtilosin P19 on *bacillus* spores

**V. D. Pokhilenko, S. K. Zhigletsova** and **T. A. Kalmantaev**
*Former owner of the Advanced Materials Laboratory, Inc. USA*

The antimicrobial properties of the activity and mechanism of action of subtilosin – bacteriocin isolated from a natural *Bacillus subtilis* strain P19 have been investigated. Its activity against gram-positive microorganisms, including *Bacillus anthracis, B. cereus*, *Staphylococcus aureus*, *Clostridium perfringens*, *C. difficile* and *Listeria monocytogenes*, has been established. Bacteriocin is resistant to pH fluctuations in the range of 2-10 units, boiling, but is destroyed by proteolytic enzymes. Bacteriocin P19 is a 3.4 kDa peptide whose production is responsible for the sba-atb gene cluster (locus BSU_37350). In electron microscopic investigation of the effect of bacteriocin on *Bacillus anthracis* spores. He effectively killed dormant *B. anthracis* spores at concentrations of 0.5–35 μg/mL after 60-min exposure. Our data, combined with analysis of the known mechanisms of the action of bacteriocins, suggest that the mechanism of spore inactivation was apparently based on multiple disruptions of the integrity of membranes of the dormant spore. It is also likely that the molecular configuration of subtilosin P19 allows it to penetrate through the outer integuments and to damage the vital membrane structures of the spores. *In vivo* experiments have established the protective effect of the drug P19 in case of lethal listeriosis in mice. A similar result was demonstrated by the antibiotic co-trimoxazole.

The activity of subtilosin against pathogen spores, including clostridia, which cause dangerous diseases and food spoilage, makes it attractive for use as a promising source of new antimicrobial drugs of natural origin, including, possibly, new targeted probiotics.

## Biography

Viktor Danilovich Pokhilenko. was born on 03/01/51. Higher education. A biologist. He works at the State Research Center for Applied Microbiology and Biotechnology (Obolensk, Moscow Region, Russia) as a leading researcher, head of the Department of Biological Technologies. PhD in Cryobiology (1984). Doctor of Science in Biotechnology (1997). The field of scientific interests. • Preservation of biomaterials: freezing-drying of microorganisms. • Drug engineering: the creation of biological products for agriculture, veterinary medicine and medicine. • Ecology: microbial purification of soil and water from anthropogenic pollutants, degradation of xenobiotics, toxicants, development of preparations of phosphate-loving microorganisms for agriculture and dry forms of bacteriophages for veterinary medicine. • Microbial screening: the search for new strains producing antimicrobial substances and symbiotic microorganisms for the development of new drugs and biologically active agents based on them. • Technologies: production of antimicrobial drugs of bacterial origin, development of new forms of probiotics and metabiotics.

# An effective combined method for data aggregation in WSNs

**Razieh Asgarnezhad**[1] and **Amirhassan Monadjemi**[2]

[1]*Department of Computer Engineering, Aghigh Institute of Higher Education Shahinshahr, Iran*
[2]*Senior Lecturer, School of Continuing and Lifelong Education, National University of Singapore, Singapore*

A wireless sensor network consists of many wireless sensors in a specific area to collect information from the environment and send the collected data to the base station. In this type of network, a sink node is applied to improve data aggregation with a mobile sink. Many methods have proposed for the use of mobile sinks and a detailed evaluation of the performance of these methods has not been provided. In this paper, the current authors present an effective and new method by combining three data collection methods and mobile sinks. Results reveal that the proposed method has a better performance in terms of parameters than other methods. A main difference is that in addition to the mobile sink, it uses other nodes called advanced nodes that direct data from the header nodes to the sink path, which ultimately results in better performance. The results show that the proposed method has more significant superiority over its comparative techniques, particularly on energy consumption, network lifetime, delay, and missing data.

## Biography

### Razieh Asgarnezhad

Razieh Asgarnezhad received her B.Sc. and MSc. degrees in Computer Engineering from Kashan Azad University in 2009 and Arak Azad University in 2012, respectively. She received her Ph.D. degree in Computer Engineering from Isfahan Azad University in 2021. She is currently a lecturer at Aghigh Institute of Higher Education in Shahinshahr. Her current researches include Data Mining, Text Mining, Learning Automata, and Wireless Sensor Network.

### S. Amirhassan Monadjemi

S. Amirhassan Monadjemi is an Associate Professor at the University of Isfahan and Senior Lecturer, School of continuing and lifelong education at the National University of Singapore. He received a Ph.D. in Pattern Recognition from the University of Bristol in 2004. His research interests include Artificial Intelligence, Machine Vision, and Data Analysis.

# Effect of nanoparticles on the structure and function of bovine heart cystatin

**Aamir Sohail[1], Mohd Faraz[2]** and **Bilqees Bano[1]**

*[1]Department of Biochemistry, Aligarh Muslim University, India*
*[2]Department of Chemistry, Aligarh Muslim University, India*

Cystatins are a family of cysteine protease inhibitors that are found in all living organisms. They play important role in regulating the activity of proteolytic enzymes, which are involved in a variety of cellular processes, including cell growth, differentiation, and apoptosis. Cystatins are also involved in the defence against pathogens. A novel cystatin was isolated from bovine heart and its interaction with nanoparticles were studies. A novel cystatin was isolated from buffalo heart through a three-step process involving ammonium sulphate fractionation, pH treatment, and gel filtration chromatography and based upon its physico-chemical characterization it was classified as a variant of type I cystatin or Stefins. The cystatin was interacted with nanoparticles to assess their effect on structural and function of the cystatin. The results showed that the binding of cystatin with both nanoparticles (ZnO and $Fe_2O_3$) decreased its anti-papain activity. This was accompanied by a decrease in the secondary structure of cystatin, as determined by circular dichroism (CD) spectroscopy, and an increase in its surface hydrophobicity, as determined by fluorescence spectroscopy. The formation of a stable intermediate molten globular state was also demonstrated by ANS fluorescence spectroscopy. However, there were no signs of aggregation, as determined by Thioflavin T (ThT) fluorescence spectroscopy. The extent of decrease in anti-papain activity and structural changes were more pronounced in case of $Fe_2O_3$ than ZnO. This suggests that $Fe_2O_3$-NPs are more potent in causing structural and functional change to cystatin than ZnO-NPs. In conclusion, the interaction of cystatin with nanoparticles exerted structural and functional changes in cystatin, which may have implications for its biological activity. It may be attributed to the side effects of using nanoparticles based drugs, therapies, imaging and cosmetics etc. The extent of these effects depends on the type of nanoparticle.

## Biography

He earned his Ph.D. in Biochemistry in 2017 from Aligarh Muslim University, India. Over the course of his career, He has published 18 research articles in international peer-reviewed journals. For a five-year period, he worked as a Health Policy Analyst in the Department of Health Research, Ministry of Health & Family Welfare, Government of India, contributing to evidence-based decision-making in healthcare. Currently, He is a Scientist at the Indian Institute of Science, Bengaluru, where his research focuses on Health Technology Assessment (HTA). HTA is a systematic evaluation process that assesses the clinical effectiveness, cost-effectiveness, safety, and societal impacts of healthcare technologies, helping government decisions on their adoption in healthcare practice and policy.

# Gene as a dynamical notion: An extensive and integrative vision. Redefining the gene concept, from traditional to genic-interaction, as a new dynamical version

**Marcos López-Pérez**

*Department of Enviromental Science, Universidad Autónoma Metropolitana (Lerma Unit) A, México*

The current concept of gene has been very useful during the 20th and 21st centuries. However, recent advances in molecular biology and bioinformatics, which have further diversified the functional and adaptive profile of genetic information and its integration with cell physiology and environmental response, have contributed to focusing on additional new gene properties besides the traditional definition. Considering the inherent complexity of gene expression, whose adaptive objective must be referred to the Tortoise-Hare model, in which two tendencies converge, one focused on rapid adaptation to achieve survival, and the other that prevents an over-adaptation effect. In this context, a revision of the gene concept must be made, which must include these new mechanisms and approaches. In this paper, we propose a new conception of the idea of a gene that moves from a static and defined version of hereditary information to a dynamic idea that preponderates gene interaction (circumscribed to that established between protein-protein, protein-nucleic acid, and nucleic acid-nucleic acid) and the selection it exerts, as the irreducible element that works in a coordinated way in a genomic regulatory network (GRN).

## Biography

Born in Burgos, 1978, Graduate in Biology with a specialty in Plant Pathophysiology and Phytotechnology (University of Salamanca), Master in Molecular Biology, PhD from the Metropolitan Autonomous University, in Mexico City, in Biotechnology, Professor-researcher C, Metropolitan Autonomous University, member of the National System of Researchers (level I). His research focus on Microbial Physiology, Antibiotic Resistance where he have 31 publications.

# Nanoparticle-based formulation of dihydroartemisinin-lumefantrine duo-drugs: preclinical evaluation and enhanced antimalarial efficacy in a mouse model

**Pesila Odera[1], Geoffrey Otieno[1], Joab Onyango[1], James Jorum[1], Florence Oloo[1,4], Martin Ongas[3,4], Jeremiah Gathirwa[2]** and **Bernhards Ogutu[3,4]**

*[1]School of Chemistry and Material Science, Technical University of Kenya, Kenya*
*[2]Centre of Traditional Medicine and Drug Research, Kenya Medical Research Institute, Kenya*
*[3]Centre for Clinical Research, Kenya Medical Research Institute, Kenya*
*[4]Centre for Research in Therapeutic Sciences, Strathmore University Medical Centre, Kenya*

Artemisinin-based combinations (ACTs) are World Health Organization-recommended treatment for malaria. Artemether (A) and lumefantrine (LUM) were the first co-formulated ACT and first-line treatment for malaria globally, artemether is dihydroartemisinin's (DHA's) prodrug. Artemisinins and LUM face low aqueous solubility while artemisinin has low bioavailability and short half-life thus requiring continuous dosage to maintain adequate therapeutic drug-plasma concentration. This study aimed at improving ACTs limitations by nano-formulating DHA-LUM using solid lipid nanoparticles (SLNs) as nanocarrier. SLNs were prepared by modified solvent extraction method based on water-in-oil-in-water double emulsion. Mean particle size, polydispersity index and zeta potential were 308.4nm, 0.29 and -16.0mV respectively. Nanoencapsulation efficiencies and drug loading of DHA and LUM were 93.9%, 33.7%, 11.9%, and 24.10% respectively. Nanoparticles were spherically shaped and drugs followed Kors-Peppas release model, steadily released for over 72 hours. DHA-LUM-SLNs were 31% more efficacious than conventional oral doses in clearing Plasmodium berghei from infected Swiss albino mice.

## Results

Figure 1: FTIR results of empty nano-particles, free and double nano-formulated drugs

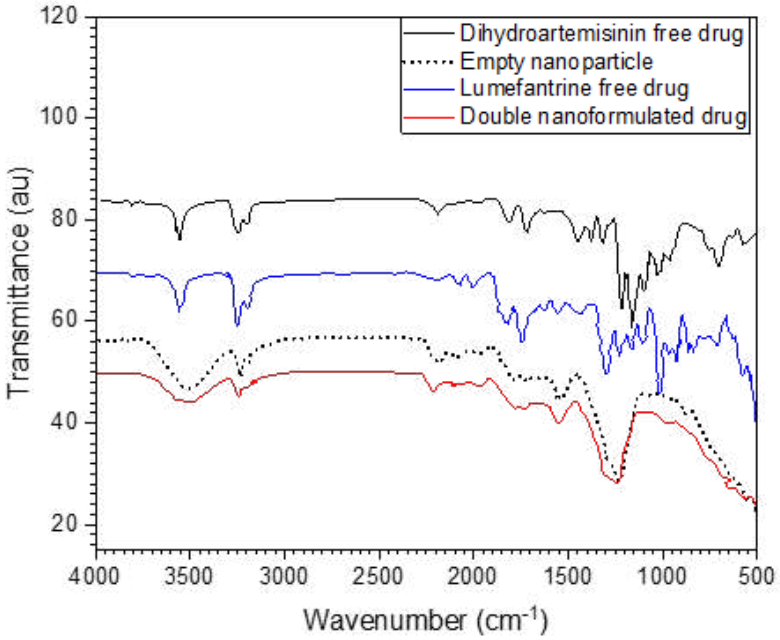



Table 1. Chemosuppression efficiency and mice survival rates Figure 1: FTIR results of empty nano-particles, free and double nano-formulated drugs

| S. No | Drug | % Chemosuppression efficiency Average±StDev | Mice Survival time (days) |
|---|---|---|---|
| 1 | Nano-formulated DHA-LUM with heparin | 88.77±8.55 | >60.00 |
| 2 | Free drugs: DHA-LUM with heparin | 57.15±12.69 | 12.00±0.02 |
| 3 | Nano-formulated DHA-LUM without heparin | 79.34±15.53 | >60.00 |
| 4 | Free drugs: DHA-LUM without heparin | 35.27±15.15 | 11.00±0.10 |
| 5 | Empty nanoparticle without heparin | 31.63±12.99 | 10.00±0.05 |
| 6 | Empty nanoparticle with heparin | 59.15±8.92 | 14.00±0.03 |
| 7 | Negative control | 0.00±0.00 | 12.00±0.01 |

## Biography

Pesila Akeyo Odera was born in Kenya. She received the B.Sc. degree in Chemistry from Moi University, Kenya, in 2011, Masters of Science degree in Analytical Chemistry from the University of Nairobi, Kenya, 2019 and currently doing her Ph.D. in Chemistry from the Technical University of Kenya, Kenya.

She joined Technical University of Kenya in 2014 as a Graduate Assistant in the then School of Physical and Applied Science in the Department of Chemical Sciences and has risen the ladder to the position of Tutorial Fellow that she currently holds. She is an alumnus of Next Generation of Scientists, which is an internship program organized by the Novartis Pharmaceutical Company to train young scientists with interests in drug discovery and development. Her current research interests include nanotechnology, drug discovery, drug delivery and environmental chemistry related research. She a student Member of the Royal Society of Chemistry and the Kenya Chemical Society.

# Mutated ribosomes in Ribosomopathies

**H. Yonath[2], DG. Hiregange[1], A. Rivalta[1]** and **A. Bashan[1]**

*[1]The Department of Chemical and Structural Biology, Weizmann Institute of Science, Israel*
*[2]Sheba Medical Center Internal, Medicine A and Genetics Institute, and School of Medicine, Tel Aviv University, Israel*

Mutations in ribosomal genes are known to be associated with a group of diseases named Ribosomopathies. Some of them are expressed in a very young age such as Diamond Blackfan Anemia and some are found in older age such as in cancer and Alzheimer's disease. So far, the exact mechanism that lead to these conditions are not known. It is not clear which of the products of these genes (namely r-protein or rRNA) are actually expressed, how and if they are incorporated into the ribosomes of the patients. Assuming that some mutated r-proteins or rRNA are formed and exist in the patients' ribosomes, we pioneered an exclusive, distinctive methodology capable of discriminating between mutated and normal ribosomes, based on the identifying the unique 3D structural motifs.

So far, despite discovering mutations in ribosomal genes, targeting these mutations was hardly explored for medical applications worldwide, owing to the assumption that all mutation-types interfere with ribosome assembly. As the clinical diversity disagrees with a single mechanism, we aim at identifying the ribosomes that contain mutations, and use their typical characteristics as a distinctive tool for detecting the mutated ribosomes. These disease-associated structural motifs should provide the ground for the synthesis of next-generation novel detection technologies. Our innovative methodology includes biophysical, genetic and the cryo-EM methods, which will advance our understanding of how these mutated ribosomes function. We expect that the combination of structural-guided basic science with the medical clinical information will significantly advance our understanding of these conditions and may lead to better detection and hopefully treatment of these conditions.

## Biography

She studied medicine in Hadassah medical school in the Hebrew University of Jerusalem. Doctoral Dissertation on Studies on the structure of RelA from *Escherichia Coli*.

She has completed a residency in Internal Medicine in Sheba Medical Center (SMC) in Ramat Gen Israel, and then another residency in Clinical Genetics in Baylor College of Medicine (BCM) in Houston Texas, USA.

Her academic experience includes research on variations in sensitivity to Warfarin, and research in high throughput genotyping and copy number variation in humans. She is an Assistant Professor at BCM and a lecturer in the faculty of Medicine, Tel Aviv University.

Currently she is the director of Internal Medicine A and head of the adult genetic services in SMC.

Her Awards include the Korenfeld Foundation Award for outstanding M.D. Thesis. And the 2017 Sheba excellence prize.

# Parasite Habitat Suitability Modelling as Demonstrative Tool of Bioinvasion using Artificial Intelligence

**Anita Yadav**[1] and **Sandeep K. Malhotra**[2]

[1]*Department of Zoology, C.M.P.P.G. Constituent College (A Constituent College of the University of Allahabad), India*
[2]*Parasitology Laboratory, Department of Zoology, University of Allahabad, India*

The utility of Maxnet Permutation importance substantiated the suitability of a habitat model. The six variables identified as most important abiotic factors for the potential distribution of nematode species were- mean sea/riverine surface temperature, land distance, salinity, depth, sea surface temperature range as well as primary production. These six variables facilitated support to the modelled habitat suitability for the definitive host species. The sea shore and freshwater river Ganges being two units, the effect of environmental and host variables over long term studies were monitored. The investigations were conducted to produce long term data on marine as wells as freshwater riverine habitats that involved as many as 10 marine fish species as well as 28 species from the latter habitats. The comparative operational data among abiotic and biotic factors were subjected to analysis using tools of artificial intelligence for elaborate substantiation of characteristics of bioinvasive bioindicators. Biostatitical applications of R and Principal Component Analysis were applied.

# Mobile cardiac pacemaker with advanced monitoring and injection systems

**Huru Orujova**

*Institute of Physics of MSE, Azerbaijan*

The presented pacemaker has its own pulse oximeter and own pacing system for the rhythm and contractions of the heart, which reads the beats and sends tiny electrical impulses and the mechanism of dosed injection of the drug to control the rate and rhythm of the heart contractions. The pacemaker monitors the heart rate and rhythm and generates electrical impulses when the heart is unable to do so. A pacemaker uses a very small amount of electricity. In this way, the pacemaker helps in creating a suitable heart rate and rhythm, which in turn helps the patient feel better. We have done research on this topic, let's take a look at the prototype. General characteristics of device: The Max30102 sensor is a module consisting of a pulse sensor and a pulse oximeter. It contains built-in light-emitting diodes, photodetectors, optics and low-noise electronics that reject ambient light. The MAX30102 provides a complete system solution to simplify the design process for mobile devices and wearable devices, works with 3.3V power supply. Communication is carried out through a standard I2C compatible interface. The module can be turned off via software with zero standby current, which means that the power rails allow it to stay open all the time. Includes heart rate monitor and pulse oximeter sensor. Small 5.6 mm x 3.3 mm x 1.55 mm 14 Pin optical module. The module includes an integrated cover glass for efficient operation. It runs on ultra-low power for mobile devices. Programmable sampling rate and LED current energy saving. Low power heart rate monitor (< 1mW). Ultra-low shutdown current (0.7µA, typical). Fast data access feature. Operating temperature ranges from -40°C to +85°C. VCC (VIN): The power supply of the module can be supplied between 3 and 5 V. GND: ground. SCL: 12C hours pin. SDA: 12C data pin.

This prototype is attached to a person's wrist and records the heartbeat through the max301/302 sensor inside. In addition, he sends information about the patient via SIM 800L. This prototype is able to inject drugs into the patient through Vaso fix. All these processes take place under the supervision of a doctor. By adding ECG electrodes to this prototype, it will be possible to see the patient's ECG history as in a Holter device.  Device works with the Blynk app and all data and processing are done through Blynk. The SIM800L GSM/GPRS module is a miniature GSM modem and you can use this module to send SMS messages, make phone calls, connect to the Internet via GPRS, as you can use it to do almost anything that a regular mobile phone can

do. In addition, the module supports quad-band GSM/GPRS networks, i.e. it will work almost anywhere in the world.

**Biography**

- Birth date and place: 05.09.1997 Baku city Azerbaijan Republic
- Education information: Higher education (bachelor's degree)
- AZERBAIJAN TECHNICAL UNIVERSITY / BIO-MEDICAL TECHNOLOGY ENGINEERING (15.09.2015 - 31.05.2019)
- Higher education (Master's) AZERBAIJAN TECHNICAL UNIVERSITY / MEDICAL DIAGNOSTIC METHODS AND DEVICES (15.09.2021 - 31.05.2023)
- Job information: PhD position in Institute of Physics 15.09.2023

# Design of a stress meter based on the electrodermal activity

**Edmore Utete** and **R. Kakunguwo**

*University of Zimbabwe, Zimbabwe*

This research project aims to design and develop a stress meter to measure stress levels in people, particularly in Low and Middle-Income Countries (LMICs). Stress is a prevalent issue that can have significant negative impacts on both physical and mental health. The electro dermal activity (EDA) measurement technique was chosen as a non-invasive and cost-effective method to measure stress levels. The stress meter design block diagram comprises several components, including the stress sensor electric circuit, filter and amplification circuit, stress alarm, and power supply. The stress sensor electric circuit consists of electrodes that act as variable resistors and produce an output voltage that changes based on the electrode resistance value. The filter and amplification circuit are used to filter and amplify the signal from the stress sensor electric circuit. The stress alarm system uses traffic light colours to indicate stress levels, with red representing high stress levels accompanied by a beeping sound from the buzzer. The power supply consists of a 9V battery that supplies power to the Arduino Uno R3 board, which in turn supplies 5V to the GSR circuit.

Simulation studies were conducted to evaluate the performance of the stress sensor electric circuit and the filter and amplification circuit. The simulation results showed that the stress sensor electric circuit was sensitive to changes in skin resistance, with higher skin resistance resulting in a higher output voltage. The filter and amplification circuit were effective in filtering and amplifying the signal from the stress sensor electric circuit.

Further testing and validation of the stress meter using actual physiological data from human subjects are necessary to determine its accuracy and reliability in real-world scenarios. The stress meter has the potential to improve stress measurement in LMICs, where stress-related issues may be more prevalent and resources for stress measurement may be limited. The stress meter could also be useful for individuals, such as students and parents, who are experiencing chronic stress due to various stressors.

## Biography

Edmore Utete is a passionate Lecturer, educator and researcher with research interest in mathematical and statistical modeling, artificial intelligence, biomedical informatics and biomedical engineering, data science, maternal health, seismology and climate change. He is keen to solving current global problems through research.

Edmore Utete is a graduate of a Master of Science Degree in Operations Research and Statistics, Bachelor of Science Honors Degree in Operations Research and Statistics from NUST (Statistics and Mathematics department) and a holder of a Postgraduate Diploma in Education from Lupane States University. He worked in the Meteorology Services Department as an attache, trained as a researcher at XMPA, Bulawayo, mathematics / statistics teacher in the Ministry of Primary and Secondary Education and currently a Lecturer of Mathematics/ Statistics in the Faculty of Medicine and Health Sciences at the University of Zimbabwe and at Gwanda State University.

As an upcoming researcher Mr. Utete is the author of research like Statistical investigation of reservoir induced seismic events in mid-Zambezi basin and risk assessment of seismic triggered Kariba dam failure and was awarded NUST Book prize for best Masters research project, and simulation of ground motion prediction equations at undergraduate level and Seismic Forecasting Using a Brownian Passage Time Distribution. He perceives challenges as a way of learning and developing.

# Optimized designed X-Shape impedance in voltage type Z-Source inverter based on average modelling

**A. Rasooli Madani, A. Ghatreh Samani** and **H. Ezoji**

*MAPNA Group, Iran*

The Z-source inverter is a desirable power converter topology for voltage source and current source converter applications, which is an exciting alternative for replacing the popular conventional type. This paper presents a novel method for optimized designing voltage-type Z-Source inverters that is innovated based on voltage source and DC-Link prerequisites such as their voltage and current values. This method is caused to reduce the size of the capacitor and inductor to the optimized values and as result decreasing of total cost and occupied space of the converter, which are applicable in hybrid electric vehicle development. Z-Source inverter's output based on its input variables and effects has been investigated to optimize the design/ control method. State space equations and root locus have been used to prove designed LC shape impedance is optimized for having of best dynamic behaviors. A prototype experimental Z-Source inverter with a rated power of 500W and switching frequency of 20 kHz is developed to demonstrate the validity of the design process. The Simulation and experimental results verify that the proposed method successfully optimizes the x-shape Impedance design.

## Biography

Ali Rassoli Madani was born in Iran in 1981. He received his B.Sc degree from Tehran University, Tehran, Iran in 2004 and his M.Sc and PHD degrees from K.N.Toosi University of Technology, Tehran, Iran in Power Electronic and electric machines engineering. He has worked in MAPNA Electrical & Control, Engineering & Manufacturing Co. (MECO) which firstly was SIEMENS and ABB representative (on thermal power plant electrical and control system) in the Middle East since 2005. His experience is design, testing, and commission of synchronous generator excitation systems (SEE), start-up frequency converters (SFC), and Variable Frequency Drives (VFD). He has designed a SIEMENS-based SEE system for steam generators and has been a member of innovative systems such as the national SEE system (MAPEX) and the national SFC system (MAPLCI) in the MAPNA Group. His research interests include control, power electronics, AC and DC drives, and electric machines.

# Development of regularization method for soft x-ray tomography in alvand tokamak

**M. Moazzemi-Ghamsari[1], M. Torkiha[1], Y. Sadeghi[2], C. Rasouli[2]** and **B. Pourshahab[2]**

*[1]University of Kashan, Iran*
*[2]Nuclear Science and Technology Research Institute (NSTRI), Iran*

The Soft X-ray (SXR) tomography system is used as an important diagnostic tool to evaluate the performance of plasma and measuring its important parameters in tokamak devices. the SXR system consists of several pinhole cameras that are installed around one poloidal plane of tokamak vacuum vessel. In each camera, the linear photodiode arrays can measure the intensity of SXR through the lines of sight. This system provides the possibility of two-dimensional(2D) reconstruction of plasma emissivity. In tokamak devices, due to the limited diagnostic ports in each poloidal cross section, the number of lines of sight is usually limited and there is not enough experimental data to perform the reconstruction process. In this case, the SXR emissivity reconstruction is mathematically ill-posed with sparse data set due to limited access to the tokamak and its solution faces many challenges. Thus, to compensate for the lack of experimental data and to achieve a physical solution, it is necessary to use effective reconstruction algorithms. In this research, the arrangement and performance of such a system was investigated in Alvand tokamak. According to the diagnostic ports available on the system, the optimal placement has been obtained for the maximum coverage of the detectors. By choosing three synthetic plasma emissivity profiles, including Gaussian, Hollow and Banana profiles, the lined-integrated data reached to detector were simulated. Two-dimensional reconstruction of plasma emissivity was done using the Tikhonov regularization method. In this method, the regularization term and parameter were calculated using the Laplace matrix and iteration method, respectively. The minimum number of pixels for discretizing the poloidal cross section of plasma was 400. For this number of pixels, the root mean square derivation of reconstruction emissivity was obtained for Gaussian, Hallow and Banana models 0.016, 0.029 and 0.031, respectively. In addition, the convergence and stability of the reconstruction method was investigated by adding random noise to the primary data. For Gaussian and Hallow profiles, adding noise up to about 20 % has not significantly affected on reconstruction results. Meanwhile, in the Banana model, the reconstruction process will lose its effectiveness only for noise more than 2 %.

## Biography

Mahsa Moazzemi-Ghamsari is in 5th year of PHD program in Design and construction of a soft x-ray diagnostic system in small Tokamak. Her research interests are in Plasma Physics, magnetic confinement fusion, Radiation Detectors and tokamak diagnostic system. I hold a Master's degree in Nuclear Physics from University of Kashan, which is considered as one of the oldest and most prestigious universities of Iran. In 2015, Iran's National Elites Foundation selected her as a talented student Based on her scientific achievement as well as excellent performance during 4 years of bachelor's course. She has enrolled in several projects, including the feasibility of design and manufacturing of an appropriate spectrometer for measuring soft and hard x-ray emission emitted from Tokamak device using gas electron multiply and photodiode array techniques. She graduates studies provided her with comprehensive understanding on dosimetry in radioactive environment, detectors and spectroscopy.

# Double layer electrodialysis cation exchange membrane by introducing chitosan/$TiO_2$ thin film nanocomposite on PVC based substrate for Cu removal from water

**Ezatollah Joudaki** and **Amin Seidypoor**

*Arak University Department of Chemical Engineering, Iran*

Double-layer (DL) electrodialysis cation exchange membranes (CEMs) were fabricated for copper ion removal from water. New membranes were prepared by deposition (chitosan-co-$TiO_2$ nanoparticles) layer on polyvinyl chloride–based hetero-geneous CEMs. The FTIR, FESEM, energy-dispersive X-ray analysis, and 3D-surface images were applied for membrane characterization. Membrane hydrophilicity, flux, conductivity, ion exchange capacity, permeability, current efficiency, energy consumption, and the reusability of membranes were studied. FTIR spectra confirmed formation of DL membrane decisively. FESEM and 3D-surface images also showed compact structure and smoother surface for the new DL membrane. The sodium flux exhibited a reducing trend for the DL membranes, whereas dialytic rate of copper ions showed an increasing behavior. The modified membrane showed higher permeability in copper ion removal. Moreover, double-layer membranes showed high reusability potential after the regeneration. A negligible change was considered on dialytic rate for the cleaned membranes after regeneration.

**Biography**

Full professor of Chemical Engineering at Arak University during 33 years.150 International papers in the ISI Journals have been published. Also 5 books have been published of his in Iran.15 Industrial project have been done and finished in Iran by him.

# Effective anomaly detection approach to classify noisy data using robust noise detection and removal technique in IoT healthcare data

**S. Subha**[1] and **J. G. R. Sathiaseelan**[2]

[1]*RESEA, Department of Computer Science, Bishop Heber College (Affiliated to Bharathidasan University), India*
[2]*Associate Professor, Department of Computer Science, Bishop Heber College (Affiliated to Bharathidasan University), India*

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.

## Biography

S. Subha, is working as an Assistant Professor in the department of Computer Science at Bishop Heber College, Trichy, Tamil Nadu, India. She has 13 years of teaching experience both in under graduate and post graduate. Her area of interest in research is Internet of Things. She has organized many academic enrichment programs such as Debian Day Marking, Value Added Course on domains of – Microsoft Essentials, Digital Marketing, Graphic Designing, and Web Development, and also published materials such as Books and e-Books for the same. She guided student's projects for both under-graduate, and post-graduate students inclusive in their succession of their career as their mentor. She has been also involved in setting question papers. She has organized Faculty Development Programs such as ChatGPT for Academics, Masterclass on implementations of Internet of Things (IoT) and also been involved with few outreach programs.

# Selective and simple determination of Isoquinoline alkaloids in Papaver species by Ion mobility spectrometry

**Vahid Ghasemi** and **Fatemeh Tajabadi**

*Medicinal Plants Research Center, Institute of Medicinal Plants, ACECR, Iran*

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.

**Biography**

Bachelor's degree in applied chemistry and master's degree in analytical chemistry and medicinal chemistry, Ph.D. in medicinal chemistry.

# Therapeutic potential of *Aloe vera* and *Aloe vera* conjugated silver nanoparticles on mice exposed to hexavalent chromium

**Tooba Nauroze[1,2], Shaukat Ali[1], Shagufta Andleeb[2], Chaman Ara[3], Iqra Liaqat[1], Hina Mushtaq[1], Samaira Mumtaz[1], Lubna Kanwal[4], Shumaila Mumtaz[1], Muhammad Adeel Farooq[1]** and **Hafiz Muhammad Tahir[1]**

[1]*Applied Entomology and Medical Toxicology Laboratory, Department of Zoology, Government College University, Pakistan*
[2]*Department of Zoology, University of Education, Pakistan*
[3]*Institute of Zoology, University of the Punjab, Pakistan*
[4]*Department of Zoology, University of Okara, Pakistan*
[5]*Department of Zoology, Government College University, Pakistan*

Hexavalent chromium (Cr (VI)) is a hazardous heavy metal that induces hepatotoxicity and nephrotoxicity. Thus, the present study was planned to explore the ameliorative potential of *Aloe vera* leaf gel extract (AV) and their conjugated silver nanoparticles (AgNPs) (AV+NP) against Cr (VI) induced toxicity in the liver and kidney. The organ indices, level of ALT, AST, ALP, MDA, total protein, and creatinine in blood serum were measured. The histopathological and micrometric analyis of the hepatic and renal tissue sections were studied. The hepatosomatic index was significantly raised (0.098±0.13 g) in Cr treated group. The blood serum level of AST (484±10.7 U/L), ALT (163±5.5 U/L), ALP (337.6±9.6 U/L), MDA (641.2±29.2 U/L) and creatinine (2.9±0.2 mg/dL) were increased significantly ($P \leq 0.05$) whereas total protein level was declined (2.9±0.2 g/dL) significantly in Cr exposed group. In histopathology, necrosis, deranged hepatic cords, impaired glomeruli, and Bowman's capsule were noted. Micrometric analysis of the liver and kidney revealed a significant surge in the size of hepatocytes and their nuclei (1188.2±467.7 $\mu^2$: 456.4±206.7 $\mu^2$), CSA of glomeruli and Bowman's capsule (9051.8±249.8 $\mu^2$: 11835.5±336.7 $\mu^2$) in Cr (VI) exposed group. Whereas, the brush border (10.1±3.0 μ) size declined significantly. With the administration of AV and AV+NP reduced the oxidative stress induced by Cr (VI).

# Metabolic surgery versus usual care effects on diabetes remission: A systematic review and meta-analysis

**Erean Shigign Malka**

*Department of Public Health, College of Health Sciences, Salale University, Ethiopia*

**Background:** Bariatric surgery is superior to usual care for diabetes remission. Previous meta-analyses were limited by pooling observational and randomized trials, using various definitions of diabetes remission, and not controlling for various diabetes medications. The current meta-analysis aimed to compare bariatric surgery and usual care regarding the same.

**Methods:** We searched PubMed MEDLINE, Web of Science, SCOPUS, and Cochrane Library for relevant articles from the date of the first inception up to February 2023. The keywords diabetes remission, Bariatric surgery, metabolic surgery, lifestyles, usual care, GLIP-1 agonists, insulin use, gastric banding, biliopancreatic diversion, sleeve gastrectomy, and Roux-en-Y gastric bypass, were used. A datasheet was used to extract the relevant data.

**Results:** Diabetes remission (complete and prolonged) was higher among bariatric surgeries compared to usual care, odd ratio, 0.06, 95 CI, 0.02–0.25 and 0.12, 95 CI, 0.02–0.72, respectively. bariatric surgery patients were younger, had higher HbA1c, odd ratio, − 3.13, 95 CI, − 3.71 to 2.54, and 0.25, 95 CI, 0.02–0.48, respectively, insulin use was higher, and glucagon-like peptide agonists use was lower among bariatric surgery patients, odd ratio, 0.49, 95% CI, 0.24–0.97, and 3.06, 95% CI, 1.44–6.53, respectively.

**Conclusion:** Bariatric surgery was better than usual care in diabetes remission. Bariatric surgery patients were younger, had higher HbA1c, and received more insulin and lower GLP-1 agonists. No differences were evident regarding body mass index and the duration of diabetes. Further trials comparing the new anti-diabetic medications and different forms of bariatric surgery and controlling for the level of exercise and diet are recommended. Keywords Bariatric surgery, Metabolic surgery, Diabetes remission, Usual care, Lifestyles.

# Short-term and long-term stability of medial olivocochlear reflex in adults with typical hearing

**S. Ruba**[1] and **M.R. Panda**[2]

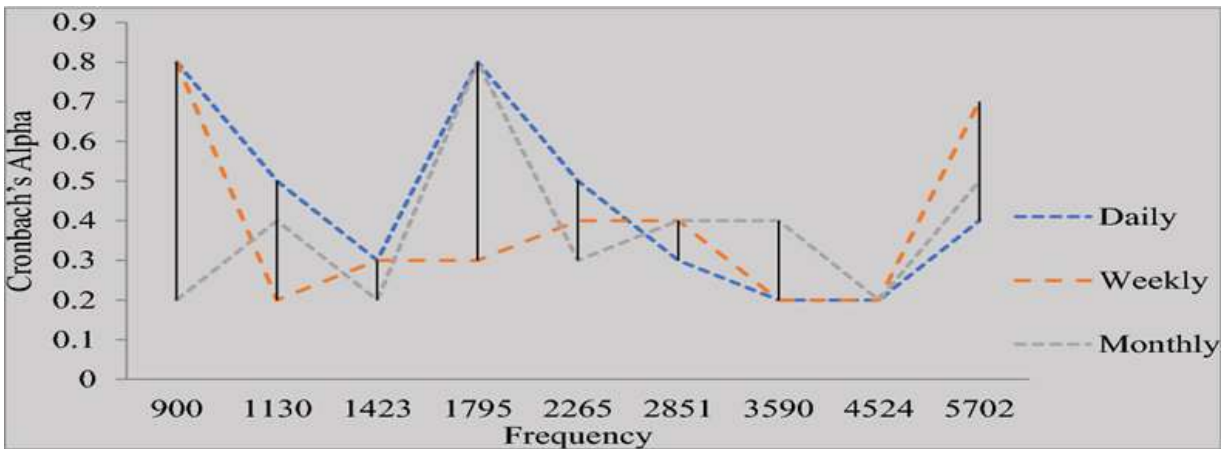
[1]*Department of Audiology & Speech Language Pathology, SRM Medical College Hospital & Research Centre, SRM Institute of Science and Technology, India*
[2]*Amplifon, Australia*

**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.

Fig 1. Shows Cronbach's coefficients for the daily, short-term, and long-term stability measurements for contralateral suppression of DPOAE



**Conclusion:** A great deal has been learned using CS of DPOAEs to study medial efferent activation. However, several unresolved methodological issues could impact the data to produce poor stability across time. Those methodological issues need to be explored and researched in the future.

### Biography

Ruba is an Assistant Professor with over 7 years of experience in the field of Speech-Language Pathology and Audiology. She has expertise in guiding, leading, and mentoring students in research projects. She is passionate about teaching, learning, and research, and She committed to helping students reach their potential. She has recently published several research articles in top journals in the field and completed international certification courses. She has been a Life Member of the Indian Speech-Language and Hearing Association (ISHA) since November 2021. She is highly organized and detail-oriented, with strong interpersonal and communication skills.

# Evaluating climate change impact on the hydrology of Kessie watershed, upper Blue Nile basin, Ethiopia

**Asnake Enawgaw Amognehegn[1], Asmare Belay Nigussie[1], Dessalegn Worku[2], Fikru F. Abera** and **Mihret Ayana[1]**

*[1]School of Civil and Water Resource Engineering and Architecture, Kombolcha Institute of Technology, Wollo University, Ethiopia*
*[2]Department of Soil Resources and Watershed Management, College of Agriculture, Woldia University, Ethiopia*

Climate change affects ecosystems, agriculture, human health, forestry, and water resource availability. This study is mainly aimed at assessing the climate change effect on the water resources of the Kessie Watershed in the Upper Blue Nile Basin, Ethiopia. The updated Coupled Model Intercomparison Project Phase 6 (CMIP-6) data outputs were used. The three climate model outputs: ACESS_ESM1-5, FGOALS_g3, and GFDL_ESM4 with two shared socioeconomic pathways (SSP2-4.5and SSP5-8.5) scenarios, were used. The climate model output rainfall and temperature data were downscaled to the station level through bias correction. The catchment hydrology was represented by the SWAT—Soil and Water Assessment Tool—through calibration and validation. Future temperatures and rainfall change were evaluated by the Mann–Kendall trend test and Sen's slope estimator. Future climate change trend analysis and streamflow simulation were done on two-time horizons: the 2050s (2041–2070) and the 2080s (2071–2100). The baseline streamflow data (1985–2014) were used as a reference. The global climate model projection data indicated mean annual precipitation and temperatures show a slight increase for the future in both scenarios for all climate model outputs. According to the SSP2-4.5 and SSP5-8.5 scenarios, respectively, mean annual precipitation is expected to increase by 5% and 4.89% in the 2050s and 10.13% and 6.8% in the 2080s based onACCESS_ESM1-5; 4.7% and 3.8% in the 2050s and 4.3% and 4.84% in the 2080s based on FGOALS_g3; and 4.67% and3.81% in the 2050s and 4.67% and 3.81% based on GFDL_ESM4 models data. Yearly average maximum temperature may increase by 3.62 °C and 1.87 °C in the 2050s and 3.31 °C and 2.99 °C in the 2080s based on ACCESS ESM1-5, 1.76 °Cand 1.25 °C in the 2050s and 3.44 °C and 2.61 °C in the 2080s based on FGOALS-g3, and 2.15 °C and 3.83 °C in the 2050sand 1.37 °C and 2.66 °C in the 2080s based on GFDL-ESM4 model data. Similarly, the mean annual minimum temperatures also expected to increase by 2.73 °C and 1.90 °C in the 2050s and 5.63 °C and 4.52 °C in the 2080s based on ACCESSESM1-5, 3.04 °C and 2.43 °C in the 2050s and 3.55 °C and 4.36 °C in the 2080s based on FGOALS-g3, and 2.31 °C and3.29 °C in the 2050s, and 3.16 °C and 3.87 °C in the 2080s based on GFDL-ESM4 model data. The streamflow is also expected to increase. In the 2050s,

simulated annual streamflow is expected to increase from 12.1 to 21.8% and 9.8 to 15.4%in SSP2-4.5 and SSP5-8.5, respectively, whereas in the 2080s, the change is expected to increase from 15.14 to 24.08% and13.08 to 41% in SSP2-4.5 and SSP5-8.5, respectively. Future water resource potential of the case study watershed seems able to support irrigation and other projects.

# Ensuring the security of biosensor devices to prevent unauthorized accesses in CPS

**Madhukrishna Priyadarsini**

*National Institute of Technology, Raipur, India*

Biosensors consist of biological sensing elements (such as enzymes, antibodies, whole cells) and a transducer that converts the biological response into digital signal. In Cyber-physical Systems (CPS), biosensors allow for real-time monitoring, analysis, and control of biological processes within the physical systems. Major application of biosensors in CPS are health monitoring, environmental monitoring, industrial bioprocess control, agriculture monitoring, etc. Ensuring the security of biosensor devices is crucial to prevent unauthorized access and protect sensitive data. In this talk, we discuss several measures in detail which are used to enhance biosensor security preventing unauthorized access. Firstly, Enhanced Role-based Access Control (ERBAC) mechanism to restrict specific functions or data based on user roles and privileges is discussed. Secondly, Transport Layer Security (TLS) and Virtual Private Networks (VPNs) for biosensor data encryption is highlighted. Thirdly, tamper-evident packaging, secure boot mechanisms are explained for prevention of unauthorized access on biosensor hardware. Similarly, regular security audits and code reviews, vulnerability assessments, patch managements are used for providing security to the software used in biosensors. In addition, physical security measures such as access control systems, physical barriers are used to prevent unauthorized physical access to biosensor devices and data storage facilities. Finally, we will discuss standards (such as GDPR, HIPAA) to protect the privacy and confidentiality of biosensor data using anonymization and pseudo-anonymization techniques.

## Biography

Madhukrishna Priyadarsini is currently working as an assistant professor in the Department of CSE at NIT Raipur, India. She completed her Ph.D. from the Computer Science and Engineering department at the Indian Institute of Technology, Bhubaneswar, India. Her current work includes Computer Network Management, Software-defined Networks, Internet of Things, Cloud Computing, Game Theory, and Security issues in SDN. She is also interested in Image processing and game theoretical approaches. She is a young professional of IEEE and has organized certain workshops in real-time implications of SDN, Cyber-Physical Systems, Machine learning, and IoT. She has published enormous number of reputed journals, conferences, books, and book chapters in the above-mentioned areas.

# A hybrid nano material based highly sensitive surface plasmon resonance biosensor for waterborne bacteria detection

**Quazi D. M. Khosru, Khandakar M. Ishtiak** and **Safayat-Al Imam**

*Department of Electrical and Electronic Engineering, University of Engineering and Technology, Bangladesh*

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 $BaTiO_3$-BlueP/$WS_2$ hybrid structure, using a $CaF_2$ 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/$WS_2$ 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 $2.894\times10^{-6}$ to $2.998\times10^{-6}$. These results indicate a balanced sensing performance for all four types of waterborne bacteria detection.

Table: Performance parameters of proposed biosensor for different waterborne bacteria detection.

| Waterborne Bacteria | Affinity RI | $R_{ang}$ (deg) | $R_{min}$ (normalized) | S (deg/RIU) | Q (1/RIU) | FOM | DA (normalized) | LOD ($10^{-6}$) |
|---|---|---|---|---|---|---|---|---|
| V. cholera | 1.365 | 80.89 | 0.012 | 333.59 | 120.65 | 119.2 | 1.206 | 2.998 |
| S. marcescens | 1.384 | 81.03 | 0.0107 | 341.8 | 121.89 | 120.58 | 1.218 | 2.926 |
| M. lysodeikticus | 1.389 | 81.07 | 0.0104 | 343.98 | 122.21 | 120.93 | 1.222 | 2.907 |
| E. coli | 1.401 | 81.16 | 0.0096 | 345.56 | 123.11 | 121.92 | 1.231 | 2.894 |

## Biography

QUAZI D. M. KHOSRU received the B.Sc. degree in electrical engineering from Aligarh Muslim University, Aligarh, India, in 1986, the M.Sc. degree in electrical and electronic engineering from Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh, in 1989, and the Ph.D. degree in electronic engineering from Osaka University, Osaka, Japan, in 1994. He was with the NCR Corporation, Bangladesh for a short period before joining BUET, as a Lecturer in July 1987 and became a Professor in May 2000. He has published and presented over 200 technical papers in international journals and conferences. His research interests widely include nanoelectronic and nanophotonic materials and devices. He was the Dean, Faculty of Electrical and Electronic Engineering, BUET during September 2021 to September 2023.

# Anisakid nemic worms find microvesicular support in their role as zoonotic bioindicators

**Sandeep K Malhotra**[1] and **Anita Yadav**[2]

[1]*Parasitology Laboratory, Department of Zoology, University of Allahabad, India*
[2]*Department of Zoology, C.M.P.P.G. Constituent College (A Constituent College of the University of Allahabad), India*

The organisms of Anisakidae, Anisakis typica, occurring in India are in possession of a variety of mechanorecptor performing, as well as chemoreceptor performing role of cephalic, body papillae. Other members of this family closeted with these human-parasitic roundworms of zoonotic significance, within the same tropical water body, the life-line of India, i.e. River Ganges, also share extracellular vesicles distributed on body organs. The very advantage of the conducting duct between dorsal tooth and excretory pore having adapted through a typical curvature at both ends near the dorsal pore underneath tooth and the ventral pore proved advantageous for microvesicles to be extracted out of excretory pore while certain few were spilled over different parts of body emanating from dorsal and ventral orifices. The critical role of microvesicles in survival and adaptation of anisakid worms have been reported (Mattiucci, 2018). The infectivity by these worms under natural conditions has been reportedly moderately low in terms of pathogenicity. It has been supposedly facilitated as they co-evolved over a longer period of time along with cetaceans, and as such along migratory fishes, as seen in freshwater river Ganges in India as well (Jaiswal and Malhotra, 2016). The cold-blooded aquatic vertebrates in which they survived effectively transferred these worms to heterothermic hosts in the long stretches of the same water body, therefore, enabling their larval forms and developmental stages merrily survive. These indeed present a unique case where haemoadaptive capacity regulating their thermoregulatory characteristics provide fascinating opportunity for parasitic worms to perform the role of bioindicators in Indian environment.

# Evaluating plant leaf tinctures against Maize Weevils (*Sitophilus zeamais* Motsch.) in stored Maize (*Zea mays* l.) under laboratory conditions

**Shetie Gatew** and **Abrham Chalew**

*Environmental Science, Department of Biology, College of Natural Sciences, Arba Minch University, Ethiopia*

Maize weevils (*Sitophilus zeamais* Motschulsky) are common stored grain pests of economic importance in several parts of Africa. Huge amount of synthetic pesticides is being used for the management crop pests, which have many negative effects on the biotic and abiotic components of the environment. Plant-derived pesticides, on the other hand, are safe to the environment; affect only target insects, low application cost and easily biodegradable. The purpose of this research was to determine the effectiveness of ethanol leaf tinctures of four selected botanicals against *S. zeamais: Brucea antidysenterica* (J.) (Waginos), *Croton macrostachyus* (Hochst.) (Broad-leaved *croton*), *Nephrolepis exaltata* (L.) (Boston fern) and *Carica papaya* (L.) (Papaya). The experiment was carried out in a completely randomized design (CRD) with four different concentrations (0 mL, 2.5 mL, 5 mL and 7.5 mL) and four plant leaf tinctures in three replicates. A random sample of 300 g of clean maize seed was treated with the four selected botanicals in plastic jars covered with muslin cloth. Twenty adult maize weevils were introduced into each disinfected treated and untreated maize grain. The mortality rate, grain damage, and F1 progeny emergences were assessed and analyzed using SPSS software version 25. The highest (100%) mortality rate of *S. zeamais* was recorded for maize seeds treated with the leaf tincture of *B. antidysenterica*, followed by maize seeds treated with the leaf tincture of *C. papaya* (97.5%) at an application rate of 7.5 mL/300g. The mean weight loss of the seeds showed a significant variation between the treatments. The mean weight loss of the seeds in the control (8.96%) was higher than the total mean weight loss treated by all plant leaf tinctures (3.66%). The emergence of F1 progeny of *S. zeamais* on maize grains showed significant differences among the treatments. The highest emergence (100%) of the F1 progenies was recorded for the control treatment followed by *C. macrostachyus* (16.65%) at a rate of 2.5 mL/300 g maize grain treatment. The study concluded that *B. antidysenterica* and *C. papaya* tinctures had the potential to control the infestation of maize grains by *S. zeamais*.

# Geomagnetic field anomalies associated with natural and man-made phenomena

**Valijon Yusupov Rustamovich**

*Seismology Institute of Sciences Academy of the Republic of Uzbekistan, Uzbekistan*

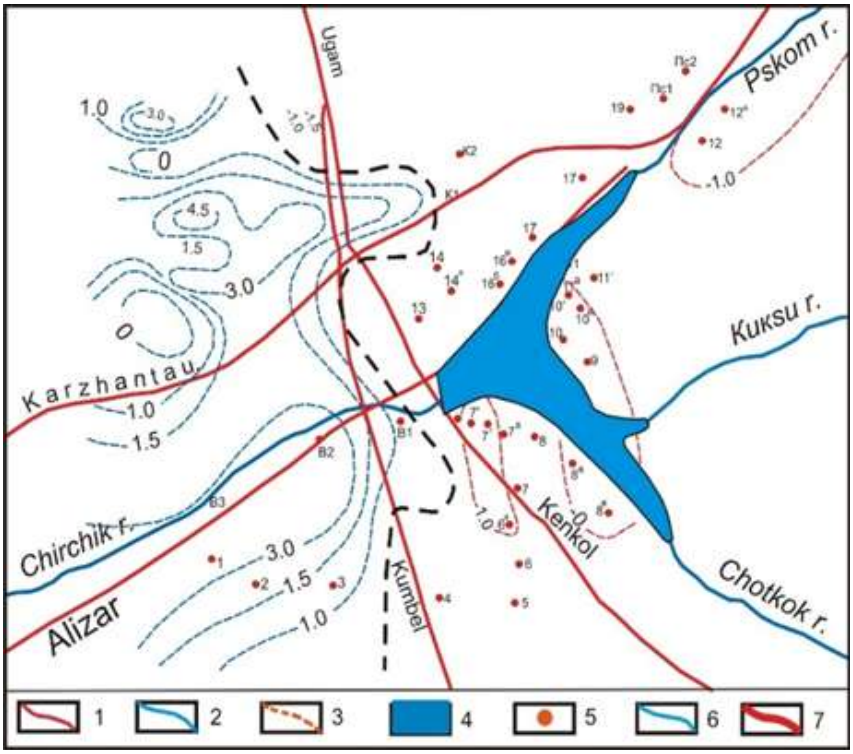
In the article, "Anomalies of the geomagnetic field on micro-polygon Charvak associated with earthquakes" details the analysis of long-term observations of the geomagnetic field on the territory of the Charvak reservoir is conducted. Which revealed, that local anomalies geomagnetic field connected with 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.

**Introduction:** Nowadays, one of the most important problems in the world considered to predict earthquakes and reduce their harmful results. In order to solve the problem it occurs to learn the apparent peculiarities of earthquake heralds in the special geodynamic fields. It demands that the observation would be carried for a long time. In this situation, making a model in natural condition during the process of earthquake preparation may give beneficial results. Technogen objects might be used as a natural model in order to learn connection between the process of earthquake preparation and the appearance of earthquake heralds. Since 1973 the staff of the laboratory “the variations of geophysics fields” at the Seismology institute of Sciences Academy of Republic of Uzbekistan has been holding the special investigation which is related to modeling on the natural way the process of earthquake preparation around the micro polygon Charvak. The same of investigation like this were observed in Talbingo reservoir, Australia (Davis P.M. Stasey F.D) [1], Nurek reservoir, Tajikistan (Karimov F.X, Proxorov A.A) [2], Tuxtagul reservoir, Kyrgyzstan (Shakirov E.Sh, Pogrebnoy V.N etc.) [3], Chirkey reservoir, Dagistan (Sulaymonov A.E) [4], Azat reservoir, Armenia (Oganesyan S.R) [5] and other places. Scientific investigation on the polygon of Charvak reservoir is superior with its size and continuation than other places. Monographs and articles, which based on scientific results between 1973 and 2001 years, were published By Abdullabekov Q.N, Berdaliyev E, Maqsudov S.X, Tuychiyev A. Yusupov V.R. and others [6-11].

**The methods of research:** The purpose of the investigation – to learn the peculiarities of local changes which is connected with the capacity and depth of reserved water in Charvak reservoir and to model the process of earthquake preparation on the natural condition, that is to say, changeable territory. By the time the changes of magnetic peculiarities in mountain chains

which were under the pressure and tempeture. Afterwards the experiments were continued in technogen objects, which produced extra pressure, that is to say, in oil- gas pits, in the territory of gas and reservoirs, in different explosion zones. One of objects like this is considered as Charvak reservoir.

Since December 1973 Geomagnetic investigations in the territory of Charvak reservoir has been started. All investigation was carried in observation stations and re-observation stations, which are located in water basin (picture 1). The stationary points are located during 1973-2010 years in points of "Charvak", "Xumson", "Yusufxona". There are 25-40 re-observation stations, but now they are 22. Geomagnetic investigation is counted with the help of magnetometer TMP, APS, MV-01. The discreet measuring accuracy of magnetometers is equal to 0.1 nTl.



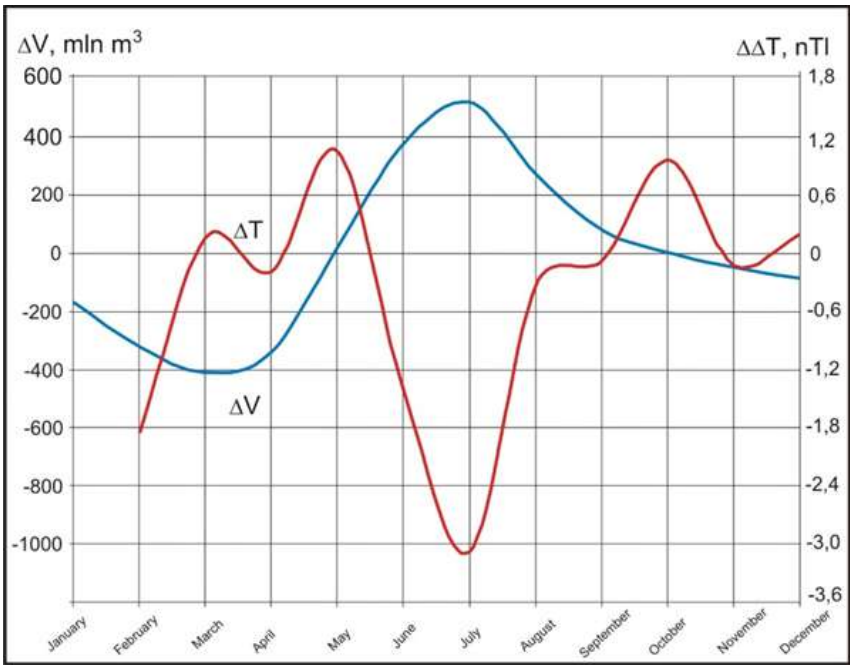

The picture 1. The schema of the polygon Charvak (N=41°38'12", E = 70°01'48").

1-3 - isolines of anomal magnetic field (1-positive, 2-negative, 3- zero); 4 - the contour of the reservoir, 5 - geomagnetic measurements stations, 6 - rivers, 7 - faults.

As now, 116 measurement cycles were carried out from 1973 to the end of 2011 year. Geomagnetic measurements results calculated as long years separated and systemized. The stations where were carried out short-time observations, were taken out off analyzing. The changes, which include systematic mistakes of supportive stations, which are identified by some observation cycles, were settled. The investigation results basically were calculated according to geomagnetic observing in a magnetic-ionosphere observatory of "Yangibazar". The investigation results in 33 re-observing stations where continuous observations were carried on during 1974-2011, were calculated according results in the first cycle of December 1973 based on the next equation.

$$\Delta Ta = \Delta Ti\ cycle - \Delta T\ 1\ cycle$$

Based on certain data in 1974-2010 year average common changes, which are linked to the water of local geomagnetic field (the picture 2).




The picture 2. Anomalies versions related to seasonal changes of water volume of geomagnetic field in the territory of Charvak reservoir.

According to the changes of water volume and surface in the territory of Charvak reservoir, each time is a tangible changed magnetic field. In addition to this, according to the presented results not only water volume and surface, but also the seismotectonic processes around the territory have strong effects on the changes of magnetic field.

In below conducted the results, which study the direct effect of different magnitudes earthquake preparation's process to local magnetic field. Studied, on during 1973-2011 the connection between the result geomagnetic observations with local –regional seismological changes of the territory in the micro polygon Charvak. For this during the period in 33 re-measuring stations checked the results of measured 116 cycle observing, systemized. The earthquakes that happened in the territory of Charvak reservoir and R=200 km radius from the reservoir were chosen in order to compare observing local anomalies in the geomagnetic square. In the selection the earthquakes that satisfied the condition R< P30 [12] in accordance with V.I.Ulamov, were chosen, that is territory is larger until 30 times than that of the earthquakes.

The methods of research. The purpose of the investigation – to learn the peculiarities of local changes which is connected with the capacity and depth of reserved water in Charvak reservoir and to model the process of earthquake preparation on the natural condition, that is to say, changeable territory. By the time the changes of magnetic peculiarities in mountain chains

which were under the pressure and tempeture. One of objects like this is considered as Charvak reservoir.

Since December 1973 Geomagnetic investigations in the territory of Charvak reservoir has been started. All investigation was carried in observation stations and re-observation stations, which are located in water basin (picture 1). The stationary points are located during 1973-2010 years in points of “Charvak”, “Xumson”, “Yusufxona”. There are 55 re-observation stations. Geomagnetic investigation is counted with the help of magnetometer TMP, APS, MV-01, GSM-19T. The discreet measuring accuracy of magnetometers is equal to 0.1 nTl.

In conclusion, it is defined that the local anomalies which were investigated in the geomagnetic field according to the result analysis of the long-term investigation in the geomagnetic field around the reservoir Charvak is diplayed together with the changes of the water volume in the reservoir and the process of changing local seismic activity. The results of the research in the territory of the reservoir Charvak could be used not only in modeling the earthquake preparation process, but also in forecasting the earthquakes, in supervising the seismic activity in the near zones of the fault Karzhantau.

**Biography**

Valijon Yusupov Rustamovich, Senior Researcher, Doctor of Philosophy of Geological and Mineralogical Sciences (PhD); Worked at the laboratory of "Physics of seismogenic processes" Institute of Seismology AS RUz; Seismology Institute of Sciences, Academy of the Republic of Uzbekistan, 3, Zulfiyakhonim Str., 100128; Associate docent of University of Geological Sciences. Tashkent, Uzbekistan.

# Innovations in safeguarding food supply: A comprehensive analysis of biosensors and AI integration for enhanced quality and safety

**Bahareh Rezazadeh[1], Samin Hajian[2]** and **Amir Masoud Rahmani[1]**

*[1]Science and Research Branch of Islamic Azad University, Iran*
*[2]Gorgan University of Agricultural Sciences and Natural Resources, Iran*

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.

**Biography**

Bahareh Rezazadeh, a highly motivated computer engineer, boasts a solid academic foundation in computer networks, distributed systems, and artificial intelligence. After completing her bachelor's degree in information technology engineering at Urmia University of Technology, Iran, she pursued higher education, attaining an MBA from the University of Tehran in 2015 and a second master's degree in computer engineering from the Science and Research Branch, IAU, Tehran, in 2022.

She notable contributions to the field are evident through four published papers in esteemed journals like Springer and IEEE. Her dedication to academic excellence extends to serving as a presenter and commentator at the 17th International Conference on Innovation, Management, and Knowledge Community in Taiwan (May 2023).

Currently, Bahareh serves as a reviewer for ISI journals published by IEEE and Wiley. She also engages in diverse research and implementation projects and remotely supervises Prof. Rahmani's research team.

# Biochemical and biocompatibility assessment of Everolimus eluting vs Sirolimus eluting stents in coronary artery aneurysms with a possible role of Methacrylate as inciting agent

**Aditya V. Ruia** and **Raghav Sharma**

*Meditrina Hospital, Ambala Cantt, India*

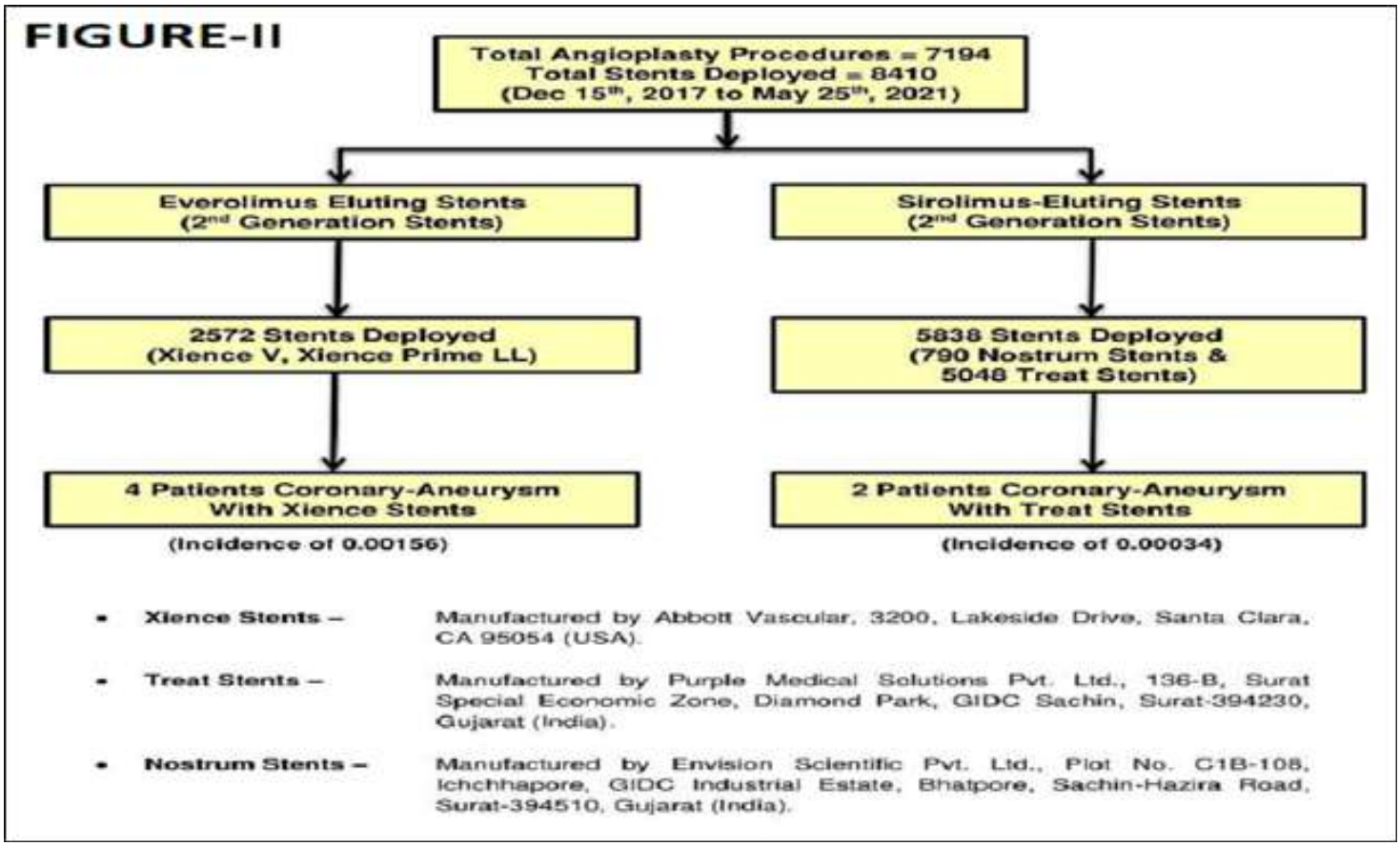
**Background:** Coronary artery aneurysms are rare, found in 0.2 to 2.3% of patients after coronary angioplasty. Cases have been reported to occur varying from 3 days to 4 years post percutaneous intervention (PCI). Here we present a case series of coronary aneurysms related to Everolimus eluting second 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.

**Table I:** - Biochemical and Biocompatibility Comparison of Everolimus and Sirolimus eluting stents

| | Xience Stent (Xience V, Xience Prime LL) | Treat Stent |
|---|---|---|
| Drug Eluted | Everolimus eluting | Sirolimus eluting |
| Terminal half-life of drug eluted | 26-30hrs | 46-72hrs |
| Generation Stent | 2nd Generation | 2nd Generation |
| Stent Thickness | 81µ | 65µ |
| Stent Material | L605 Cobalt-Chromium Alloy | L605 Cobalt-Chromium Alloy |
| Biocompatibility of stent material | Contains 9-11% Nickel, Chromium. Can occasionally cause metal allergy | Contains 9-11% Nickel, Chromium. Can occasionally cause metal allergy |

| | | |
|---|---|---|
| Drug Carrier/Polymer | Primer layer of PBMA (Poly N Butyl Methacrylate) and a drug reservoir made of poly-vinylidene fluoride-co-hexafluoropropylene (PVDF-HFP) | Biocompatible lactide and glycolide family of biodegradable polymer |
| Biocompatibility of Drug carrier/ Polymer | Primer-Methacrylate known to cause hypersensitivity reaction and aneurysm formation Reservoir- PVDF-HFP is bio compatible | Biocompatible |




**Discussion and Conclusions:** In our series the coronary aneurysms as defined by Aoki et al more closely resembled hypersensitivity related type II aneurysms. Type II stent induced aneurysms present sub acutely due to hypersensitivity reaction to either the stent metal/alloy, the drug polymer or due to the anti-proliferative action of the drug which prevents proper endothelialization. The Cobalt Chromium stents contain 9-11% nickel which can cause allergy but more commonly presents as ISR than aneurysms. The Xience V/Prime-LL stents used here has a two layer coating composed of primer layer of PBMA (Poly N Butyl Methacrylate) and a drug reservoir made of poly-vinylidene fluoride-co-hexafluoropropylene (PVDF-HFP). The drug reservoir PVDF is bio-compatible as they preferentially adsorb albumin to fibrinogen

and preventing platelet activation. On the contrary the primer layer containing PBMA-Methacrylate is known to induce allergic hypersensitivity consisting primarily of eosinophils and lymphocytes. Sirolimus and Everolimus both prevent neo-intimal proliferation but also delay re endothelialization. Here we also had two patients who developed stent induced aneurysm formation after implantation of 2nd generation Sirolimus eluting stents whose morphology were similar to Everolimus eluting 2nd generation stents.

**Conclusions:** Coronary artery aneurysms after stent implantation are rare but occasionally giant aneurysms are formed with a toxic course. The presence of Methacrylate in stent drug carrier maybe a possible inciting agent which needs further evaluation. The incidence of aneurysms after Everolimus and Sirolimus eluting stent deployment do not differ much.

### Biography

Dr. Aditya Vikram Ruia is an Interventional cardiologist in India with a deep academic and research inclination. He has several international academic papers to his credit and has authored the book Cardiology Guide. He wants to collaborate into 3D ECG evaluation techniques and into artificial intelligence aided image guided automatic robot angioplasty innovation.

# Fabrication of novel graphene oxide electrodes for electrochemical applications

**Haleemat Iyabode Adegoke**[1] and **Bashir Dayo Abdulrahman**[1,2]

[1]*Department of Chemistry, University of Ilorin, Nigeria*
[2]*Institute of Applied Sciences, Science Laboratory Technology, Department of Chemistry Unit, Kwara State Polytechnic, Nigeria*

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/cm$^2$ and 4.2695E-05 A/cm$^2$. 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.

## Biography

Dr. Haleemat Iyabode Adegoke attended University of Ibadan, Ibadan, Nigeria where she obtained her B.Sc. degree (Chemistry) in 2000. She thereafter bagged her M.Sc. and Ph.D degrees in Chemistry between 2004 and 2013 respectively. She took up appointment as an Assistant Lecturer in 2008 in the Department of Chemistry, University of Ilorin. She rose through the ranks to the position of Reader in 2020. She was a Visiting Scholar at the Chemical Engineering Department of Massachusetts Institute of Technology, MIT, Cambridge in the year 2019. She was a TWAS-CSIR Post-Doctoral Fellow at Central Salt and Marine Chemical Research Institute, Bhavnagar, Gujarat State, India in 2021. Her research interest is in the area of Material Synthesis and applications for environmental remediation. She is a member of several professional bodies including Chemical Society of Nigeria, Material Society of Nigeria, African Material Research Society.

# Neoadjuvant therapy in non-metastatic breast cancer in Kurdistan, Iraq

**Karez Sarbast Namiq** and **Luqman R. Sulaiman**

*Department of Medicine/College of Medicine/Hawler Medical University/Nanakali Hospital for Blood Diseases and Cancer, Iraq*

**Background:** Breast cancer is the most common cancer in women. Locally advanced breast cancer (LABC) is defined as inoperable breast adenocarcinoma without distant metastases. Patients with LABC require a multidisciplinary approach. Its core management includes surgical removal of the tumor either by breast conserving surgery (BCS) or mastectomy, and there is a great variability in surgical practice for treating that cancer in different countries. Neoadjuvant chemotherapy has been the standard treatment for locally advanced breast cancer for the purpose of downstaging or for conversion from mastectomy to BCS.

**Purpose:** This study aimed to assess the treatment approach for nonmetastatic breast cancer in the Kurdistan region of Iraq and to compare its alignment with the current international recommendations for cancer treatment.

**Patients and Methods:** We retrospectively reviewed the records of 1000 eligible patients who underwent either breast-conserving surgery or mastectomy for non-metastatic invasive breast cancer at oncology centers located in the Kurdistan region of Iraq between the period 2016–2021.

**Results:** Out Of 1000 patients (median age, 47 years (range, 22–85 years)), 60.2% underwent a mastectomy and 39.8% underwent breast conserving surgery. The proportion of patients treated with neoadjuvant chemotherapy has increased over time, with 8.3% of patients receiving neoadjuvant treatment in 2016 compared to 14.2% in 2021. Similarly, breast-conserving surgery has risen from 36.3% in 2016 to 43.7% in 2021. Most patients who underwent breast-conserving surgery had early breast cancer with a low nodal involvement burden.

**Conclusion(s):** The increasing trends of breast-conserving surgery practice in locally advanced breast cancer along with the increased use of neoadjuvant chemotherapy in the Kurdistan region in recent years comply with international guidelines. Our large multicenter, real-life series emphasizes the urgent need to implement and discuss more conservative surgical approaches, enhanced with the broader use of neoadjuvant chemotherapy, through education

and information programs for health providers and patients, in the context of multidisciplinary team discussions, to deliver high-quality, patient centric breast cancer care.

**Biography**

Karez Sarbast Namiq, Medical Oncologist/MSc, Iraq.

ESO certificate of competence in Breast Cancer - fourth cohort (CCB4)

ESCO graduate at the college of the European school of Oncology.

Certified Oncology Nutrition Consultant.

# The Impact of $Zn^{2+}$ Ions on dielectric properties and initial permeability of Ba-Ni Ferrite Nanoparticles through nonmagnetic doping

**Sadiq. H. Khoreem[1,2], A. H. AL-Hammadi[2]** and **Azmi A.M. Othman[2]**

*[1]Department of Optometry and Vision Science/ Faculty of Medical Sciences, Al-Razi University, Yemen*
*[2]Department of Physics, Faculty of Science, Sana'a University, Yemen*

The effects of composition, temperature, and frequency-dependent dielectric properties of barium-nickel-based ferrites have been investigated. The conventional ceramic technique prepared the compositions $BaNi_2$-$xZnxFe_{16}O_{27}$ (at x = 0.0, 0.4, 1.2, and 2). According to the frequency and Zn concentration, the dielectric parameters were properly set. Overall, the dielectric properties of this sample make them a suitable candidate for flexible super capacitors and are best suited for high-frequency region applications. The initial magnetic permeability of the prepared sample was increasing as the Zn ions contents increase. The produced samples were suitable for application as microwave absorbers, data storage appliances, and magnetic recording mediums. Generally, the decrease in dielectric parameters such as loss tangent and increased dielectric constant resulting from the incorporation of $Zn^{+2}$ ions advocate appropriation of these materials in high-frequency applications such recording media, sensors, circulators, microwave devices, electronic devices, and phase shifters. The samples' frequency-dependent ac conductivity has grown as their frequencies got higher. The samples' initial permeability to magnetic fields showed an upward trend as Zn concentrations rose and displayed ferromagnetic activity. As $Zn^{2+}$ ion replacement increases, the initial magnetic permeability increases. This might be accounted for by magnetic $Ni^{2+}$ ions replacing non-magnetic $Zn^{2+}$ ions. Based on the generated samples may be employed in microwave absorbent and data storage devices based on their magnetic characteristics.

**Biography**

Deputy Editorial Director: Nanotechnology Journal of the Malaysian Institute [ 01/03/2023 – Current- Deputy Editor-in-Chief SCIREA Journal of Materials.

He is lecturer at Saada University - College of Applied Sciences + College of Education Lecturer at Al-Razi University - Faculty of Medical Sciences.

He is lecturer at Ibn Al-Nafis University - Faculty of Medical Sciences Lecturer at University of Science and Technology Lecturer at Saeeda University).

# Modification of flexible electrodes for P-Type (Nickel Oxide) dye- sensitized solar cell performance based on the cellulose nanofiber film

**HF Etefa[1,2], V Kumar[3], FB Dejene1, MT Efa[2]** and **LT Jule[2]**

*[1]Department of Chemical and Physical Sciences, Walter Sisulu University (Mthatha Campus), South Africa*
*[2]Department of Chemistry, College of Natural and Computational Science, Dambi Dollo University, Ethiopia*
*[3]Department of Physics, The University of the West Indies, Trinidad and Tobago*

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%.

## Biography

Dr. Habtamu F Etefa is graduated Ph.D. from National Taiwan University of Science and Technology. Presently, he is permanent Postdoctoral researcher at Department of Chemical & Physical Science, Walter Sisulu University, South Africa. He has supervised 5 postgraduates, 1Co- supervised PhD's students, published 11 research papers, and three books. He is active reviewer of 2 journals, delivered 5 Invited talks, evaluated 15 external MSc theses and presented 20 conference papers. He is the recipient of international conference organizing convener award.

In addition, Dr. Etefa made numerous contributions in serving as different E-International Organizing committee, reviewer, as guest editor, and editor for various national and international journals. Organize national and international conference and achieved a lots of awarded.

# Improving the fatigue design of mechanical systems such as refrigerator

**Seongwoo Woo**

*Mechanical Technology Faculty, Ethiopian Technical University, Ethiopia*

To enhance the lifetime of mechanical system such as automobile, new reliability methodology – parametric Accelerated Life Testing (ALT) – suggests to produce the reliability quantitative (RQ) specifications—mission cycle—for identifying the design defects and modifying them. It incorporates: (1) a parametric ALT plan formed on system BX lifetime that will be X percent of the cumulated failure, (2) a load examination for ALT, (3) a customized parametric ALTs with the design alternatives, and (4) an assessment if the system design(s) fulfil the objective BX lifetime. So, we suggest a BX life concept, life-stress (LS) model with a new effort idea, accelerated factor, and sample size equation. This new parametric ALT should help an engineer to discover the missing design parameters of the mechanical system influencing reliability in the design process. As the improper designs are experimentally identified, the mechanical system can recognize the reliability as computed by the growth in lifetime, LB, and the decrease in failure rate. Consequently, companies can escape recalls due to the product failures from the marketplace. As an experiment instance, two cases were investigated: 1) problematic reciprocating compressors in the French-door refrigerators returned from the marketplace and 2) the redesign of hinge kit system (HKS) in a domestic refrigerator. After a customized parametric ALT, the mechanical systems such as compressor and HKS with design alternatives were anticipated to fulfil the lifetime – B1 life 10 year.

## Biography

Dr. Woo has a BS and MS in Mechanical Engineering, and he has obtained PhD in Mechanical Engineering from Texas A&M. He majors in energy system such as HVAC and its heat transfer, optimal design and control of refrigerator, reliability design of thermal components, and failure Analysis of thermal components in marketplace using the Non-destructive such as SEM & XRAY. In 1992.03–1997 he worked in Agency for Defense Development, Chinhae, South Korea, where he has researcher in charge of Development of Naval weapon System. He was working as a Senior Reliability Engineer in Refrigerator Division, Digital Appliance, SAMSUNG Electronics. Now he is working as associate professor in mechanical department, Ethiopian Technical University.

# Effect of agricultural land management practices on the selected soil quality indictors: empirical evidences from the south Ethiopian highlands

**Aklilu Abera**

*Addis Ababa University, Ethiopia*

**Background:** Land degradation is a major challenge that adversely affects soil fertility, agricultural production, and environmental sustainability. To curb this, various agricultural land management (ALM) measures have been practiced for the last three decades. This research investigated the effects of ALM practices on selected soil quality indicators in the Ojoje sub-watershed, Southern Ethiopia Highlands.

**Method:** A total of 72 composite soil samples were collected from non- treated and treated plots (i.e., land treated for 5 and 10 years with only physical practices and integrated measures) at a depth of 0–20 cm. A one-way ANOVA was used to demonstrate statistically significant variations on soil quality indicators. Simple regression analysis was used to explain the proportional variance of soil quality indicators due to ALM measures.

**Result:** The findings of the study indicate that integrated ALM practices have positive effects on the soil quality indicators. Most soil quality indicators, such as the soil organic carbon, soil organic matter, total nitrogen, available phosphorous, sulfur, boron and percentage of cation exchange capacity, were significant ($p < 0.01$ and $p < 0.05$) as a result of ALM practices. However, soil bulk density, potassium and percentage of silt contents were higher, but the difference was insignificant. Thus, the mean value of soil quality indicators increased steadily with age of intervention and application of integrated physical and biological conservation measures.

**Conclusion:** ALM practices had stronger effects when land was treated with integrated ALM measures and con- served for an extended period of time. Hence, integrating ALM practices and maintaining them for the long term is crucial for improving soil quality and enhancing agricultural productivity.

# Genetic association of rs2237572 cyclin-dependent kinase 6 gene with breast cancer in iraq

**Dalya Shakir Al-Owaidi**[1] and **Moaed E. Algazally**[2]

[1]*Amustaqbal University, Iraq*
[2]*Babylon University, Iraq*

This case–control study is aimed to evaluate serum concentration of Cyclin- Dependent Kinase 6 (CDK6) and the genetic association between rs2237572 CDK6 gene and breast cancer (BC) in Iraq. To attain this goal, 80 patients with BC as cases and 80 healthy individuals as controls were included. Further, BC patients were sorted according to the molecular classification into four subtypes of Luminal A, Luminal B, Her2/neu enriched and TPN. Serum concentration of CDK6 enzyme, allelic and genotypic frequencies of rs2237572 CDK6, and the occurrence of BC phenotype and its subtypes in the studied population were investigated. ELISA technique was used to perform the biochemical testing, while the molecular analysis was achieved by real-time PCR, high resolution melting analysis, conventional PCR, as well as sequencing analysis. The results revealed no significant difference in serum concentration of CDK6 enzyme between patients and healthy controls (p 0.05). Also, no significant differences were shown between BC patients subtypes (p 0.05). The rs2237572 CDK6 genotypes were associated with the BC and affirmed that allele C was inherited as a recessive risk factor. Moreover, a highly significant difference between patients subtypes in genotypic frequency of rs2237572 (p 0.01) was noted. Furthermore, the association of rs2237572 genotypes and CDK6 serum concentration in BC patients showed a considered significant difference between C/C and T/T, C/C and T/C and the CDK6 level (p 0.05). Nevertheless, T/T and T/C did not show any significant difference with the CDK6 level. Hence, it was concluded that the rs2237572 of CDK6 gene is significantly correlated with BC.

## Biography

Dalya Shakir Obaida Al-Owaidi is a dedicated professional with a strong background in Clinical Biochemistry. Holding a PhD from Babylon University College of Medicine, Dalya has demonstrated her commitment to advancing knowledge in the field.

Currently serving as a Lecturer at Al-Mustaqbal University's College of Medical and Health Techniques, Dalya plays a crucial role in shaping the future of healthcare professionals. Her passion for education is evident in her dynamic approach to teaching.

In addition to her academic role, Dalya serves as a Specialist in Medical Labs for the Ministry of Health in Iraq. Her expertise contributes to the efficiency and effectiveness of medical services provided by the ministry.

With a commitment to excellence in both academia and healthcare, Dalya Shakir Obaida Al-Owaidi stands as a valuable asset in the realm of clinical biochemistry. For inquiries or collaboration opportunities, she can be reached at drdalyashakir@gmail.com or by phone at 00964781201526

# Electrospun PVA/CuONPs/Bitter gourd nanofibers with improved cytocompatibility and antibacterial properties: Application as antibacterial wound dressing

**Aiman Shahbaz[3], Muhammad Nauman Sarwar[1], Hina Ghulam Ali[2], Sana Ullah[1], Kentaro Yamashita[1], Umair Nisar[4], Motahira Hashmi[1]** and **Ick-Soo Kim[1]**

*[1]Nano Fusion Technology Research Group, Institute for Fiber Engineering (IFES), Interdisciplinary Cluster for Cutting Edge Research (ICCER), Shinshu University, Japan*
*[2]Faculty of Inorganic Chemistry, Karlsruhe Institute of Technology, Research Center Helmholtz Institute of Ulm (HIU), Germany*
*[3]Department of Chemistry, Sargodha Campus, The University of Lahore, Pakistan*
*[4]Center for Solar Energy and Hydrogen Research, Faculty of Natural Sciences, Ulm University, Germany*

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.

## Biography

Aiman Shahbaz is currently a graduate student at University of Iowa, USA. She worked as a Lecturer at the department of Chemistry, University of Lahore- Sargodha campus. She has done her Mphil at the Department of Chemistry, University of agriculture Faisalabad. She has done her B. Sc hons Chemistry from department of chemistry, Kinnaird college for Women Lahore. Aiman does research in Analytical Chemistry, Nanotechnology and Materials Chemistry.

# Advanced biosensing platforms for real-time monitoring of cell behaviour in tissue engineering constructs

**Ikhazuagbe H. Ifijen**

*Department of Research Outreach, Rubber Research Institute of Nigeria, Nigeria*

Regenerative medicine and tissue engineering hold immense promise for addressing the growing demand for viable therapeutic solutions in healthcare. Central to the success of these approaches is the ability to precisely monitor and modulate the behaviour of cells within engineered tissue constructs. In this context, biosensors and bioelectronics emerge as indispensable tools for enabling real-time assessment and control of cellular activities critical for tissue regeneration. This study presented an overview of advanced biosensing platforms designed for the dynamic monitoring of cell behaviour within tissue engineering constructs. The proposed biosensors integrate cutting-edge technologies, including microfluidics, nanomaterials, and bioelectronics, to achieve high sensitivity, spatial resolution, and temporal accuracy in detecting key cellular parameters. By leveraging techniques such as impedance spectroscopy, fluorescence imaging, and electrochemical sensing, these platforms enable real-time monitoring of critical cellular processes such as viability, proliferation, differentiation, and metabolic activity. Furthermore, the abstract discusses the integration of bioelectronic devices into tissue engineering scaffolds to provide precise control and modulation of cellular behaviour. By interfacing with the cellular microenvironment, these bioelectronic systems offer unprecedented opportunities to dynamically regulate cell fate and tissue development. The presented research highlights the potential of advanced biosensing platforms to accelerate the development of functional tissue substitutes with enhanced therapeutic efficacy and clinical relevance. Overall, this study underscores the pivotal role of biosensors and bioelectronics in advancing regenerative medicine and tissue engineering strategies, ultimately paving the way for the development of next-generation therapies and biomedical applications.

## Biography

Dr. Ikhazuagbe Hilary Ifijen is a passionate researcher with a strong academic background in Industrial Chemistry, culminating in a B.Sc. and M.Sc. from the prestigious University of Benin in 2008 and 2013, respectively. In 2018, he attained his Ph.D. in Chemistry, during which he held a prestigious research fellowship at the CSIR-National Institute for Multidisciplinary Science and Technology in India. His doctoral research was centred on "fabricating photonic crystals for multi-functional applications," showcasing his expertise in cutting-edge materials science.

Driven by a relentless pursuit of scientific excellence, Dr. Ifijen has secured multiple research grants to delve deeper into the realm of nanotechnology. Notable among these are the TEDFUND Group Grant Awards from the University of Benin,

amounting to 42,180,000.00 Naira across 2021 and 2022. His research endeavors have significantly contributed to the advancement of nanomaterials research, positioning him as a leading figure in the field.

Currently serving as a Principal Research Officer at the Department of Research Outreach at the Rubber Research Institute of Nigeria in Benin City, Edo State, Dr. Ifijen continues to make impactful strides in scientific inquiry. With over 100 publications in peer-reviewed journals, his work has garnered widespread recognition and acclaim within the scientific community.

Beyond his professional pursuits, Dr. Ifijen finds joy and fulfillment in his family life. He is happily married to Mrs. Precious Olohi Ifijen, and together they cherish the blessings of parenthood with their two lovely daughters. Dr. Ifijen's multifaceted journey as a researcher, mentor, and family man exemplifies his unwavering dedication to making a positive impact on both the scientific landscape and personal spheres of life.

# Study of the role of titanium and iron cathodic cages on plasma-nitrided aisi 430 ferritic stainless steel

**Mirza Z. Babur[1], Aiyah S. Noori[2], Zafar Iqbal[1], Muhammad Shafiq[3], Muhammad Asghar[3], Abdulaziz H. Alghtani[4], Vineet Tirth[5,6], Ali Algahtani[5,6]** and **Abid Zaman[1]**

*[1]Department of Physics, Riphah International University, Pakistan*
*[2]Medical Physics Department, Al-Mustaqbal University College, Iraq*
*[3]Department of Physics, Quaid-i-Azam University, Pakistan*
*[4]Department of Mechanical Engineering, College of Engineering, Taif University, Saudi Arabia*
*[5]Department of Mechanical Engineering, College of Engineering, King Khalid University, Saudi Arabia*
*[6]Research Center for Advanced Materials Science (RCAMS), King Khalid University Guraiger, Saudi Arabia*

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.

# Safety and health risks associated with illegal municipal solid waste disposal in urban Zimbabwe. “A case of Masvingo City”

**Amato Chiresh, Tapiwa Shabani** and **Takunda Shabani**

*Midlands State University, Zimbabwe*

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.

### Biography

Amato Chireshe is a holder of a PhD in Environmental Management (University of South Africa). He is a holder of a Master of Science in Safety, Health and Environmental Management at Midlands State University, Zimbabwe. He also has a B.Sc. in Geography and Environmental Studies (Zimbabwe Open University). For the past few months, he has been involved in teaching and helping undergraduate and postgraduate students to improve their academic writing skills. Amato Chireshe’s research interest includes waste management, safety, health and the environment.

# Formulation and *in vitro* evaluation of pH-Sensitive cross-linked xanthan gum-grafted acrylic acid copolymer for controlled delivery of Perindopril Erbumine (PE)

**Hira Ijaz**

A novel xanthan gum-co-acrylic acid superabsorbent hydrogel composite was formulated by free radical polymerization reaction of acrylic acid on xanthan gum. Effect of variables like dynamic swelling ratio, equilibrium swelling ratio, drug loading and drug release was investigated. Swelling ratio increases with decrease in crosslinker concentration. Drug release studies were conducted in pH 7.4 and 0.1N HCl. In acidic environment, drug release was low whereas it was sustained release in alkaline. XG4 showed significant swelling and drug release up to 24 hr. Physicochemical evaluation also confirmed it was optimized formulation. Hence XG4-co-AA was optimized for once daily dose of Perindopril Erbumine.

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

**Aghapy Yermans Yakoup, Abdallah S. Abdelsattar, Yousef Khaled** and **Anan Safwat**

*Center for microbiology and phage therapy (CMP), Egypt*

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

### Biography

Aghapy Yermans Yakoup, is a senior student in biomedical sciences major, medical sciences concentration, at Zewail City for Science and Technology. She is expected to be graduated in June 2023. She has worked as a junior researcher assistant in the Center for microbiology and phage therapy since Fall 2022 till now. She was interested in the medical microbiology field and in the future, She is planning to hold her PhD degree on infectious diseases in different body systems like the nervous system and cardiovascular system.

publications in high impact journals and in numerous national and international projects. Subsequently, Dra. Inés Peraile began her research career at *National Institute of Aerospace Technology* (INTA), in the Biological Defence Area, in 2010, taking up her position as a Senior Scientist at OPIS, with destination INTA, in November 2021. In September 2022 she was appointed Head of the Immunology Laboratory of the Biological Defence Area. During her stay at INTA she has participated in several national and European projects related to the diagnosis of pathogenic biological agents in the field of biosafety, both microorganisms and toxins, in environmental matrices. The results obtained in the framework of these projects have given rise to several publications, communications to national and international congresses.

## About us

A confluence of Erudite and Knowledge-Seeker

# Peers Alley Media

A global consortium of the scientific fraternity, scholars, educationists, industry leaders and entrepreneurs to collaborate, share ideas and knowledge to resolve challenges across medicine, science, technology and business

## Our Vision

"We aim to bring the research and innovations happening across the parts of the globe to facilitate interaction, knowledge sharing and exchange. We also aim to inspire university professors, students, researchers, clinicians and entrepreneurs from across the disciplines including but not limited to clinical, medical, business, technology, healthcare and pharmaceutical fields. Our dream is to bring advancements in the Science and Technology to the mankind through our scientific gatherings and deliberations. We believe in introducing novel methods and innovative techniques in science, business and technology to provide understanding on the developments".

## Our Mission

How do we serve our target groups in the scientific & business community?

- We bring the untold research accessible for many.
- Our events meet the research needs of the target groups across the academia, industry, corporates, the government, non-government agencies and public bodies.
- We Engage. Enlighten. Empower people deprived of information.
- We connect the international giants towards finding simple solutions to the complex medical and healthcare challenges of the globe.
- We unveil the unlimited research opportunities to the sections of population that is away from the developments in science and technology.
- We encourage Young and emerging researchers and scholars.
- We extend continuous education credits to boost the career and academic progress.
- We encourage start-ups in science, technology and business for the social and economic empowerment of the enthusiastic entrepreneurs.

**Peers Alley Media**
1126 59 Ave East, V5X 1Y9, Vancouver BC, Canada
Ph : +1 873-371-5878 | Contact us: contact@peersalley.com

# INDEX

# NOTES

# BOOKMARK YOUR DATES

2nd Global Conclave on

# Future of Biosensors and Bioelectronics

2nd Euro-Global Summit on

# Advances in Structural Biology and Protein Chemistry

**June 2025 | London, UK**