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Virtual Event

3rd GLOBAL CONFERENCE ON

ADVANCED NANOTECHNOLOGY & NANOMATERIALS

September 14, 2023

NANO INTELLECTS 2023

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PROGRAM-AT-A-GLANCE

Nano Intellects

2023

SEPTEMBER 14, 2023

Scientific Program

British Summer Time

06:45-07:00	**Opening Ceremony**

Distinguished Speaker Talks

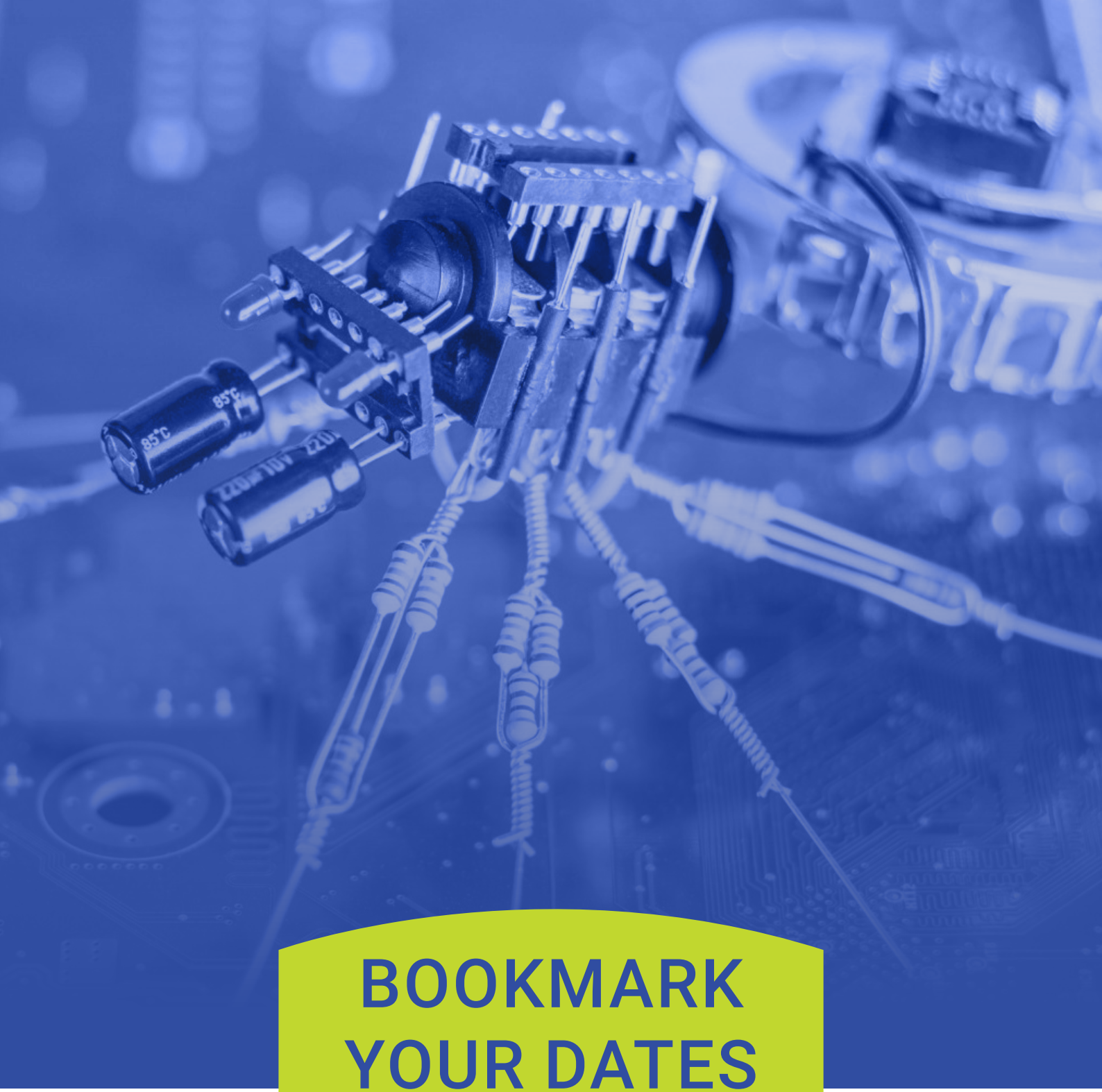
Topics: Nanoscience and Technology | Nano-Surgery | Materials Science and Engineering | Nano Chemistry | 3D Printing | Nanotechnology and Energy | Artificial Intelligence | Nano Mechanics | Nano-systems | Nanobots | Nano Physics | Nanosensors | Robotics

07:00-07:20	**Title: Structure and application of lithium-ion endohedral [C60] fullerene** **Eunsang Kwon,** *Tohoku University, Japan*
07:20-07:40	**Title: Advanced ZnO based piezo-phototronic optoelectronics** **Wenbo Peng,** *Xi'an Jiaotong University, China*
07:40-08:00	**Title: Ultrasonically catalyzed gas sensor systems and their performance enhancement by ML algorithms** **Junhui Hu,** *Nanjing University of Aeronautics and Astronautics, China*
08:00-08:20	**Title: A low-cost synthesis and preparation technology of one-dimensional silicon carbide nanowires** **Pengchao Kang,** *Harbin Institute of Technology, China*
08:20-08:40	**Title: Construction of an excellent 7 mRNAsi-related gene model based on cancer stem cells for predicting survival outcome of cervical cancer** **Huan Wu,** *Chongqing Medical University, China*
08:40-09:00	**Title: Nucleation and growth of nano-sized bubble on hydrophobic surfaces** **Ho-Young Kwak,** *Chung-Ang University Seoul, South Korea*
09:00-09:20	**Title: Exploring the feasibility of nanotechnology in controlled environment agriculture** **Praseetha P Nair,** *Government Engineering College, India*

09:20-09:40	**Title: Cellular automata-based multi-bit stuck-at fault diagnosis for resistive memory** **Sutapa Chatterjee Sarkar,** *The Neotia University, India*
Refreshment Break 09:40-10:00	
10:00-10:20	**Title: Synthesis of non-selective sorbent modified with carbon nanomaterials and their hemocompatibility** **Maxwell Opoku,** *Novosibirsk State Research University, Russia*
10:20-10:40	**Title: Effects of Boron / Nitrogen / Phosphorus doping on the scavenging action of armchair single-walled carbon nanotubes (armchair-SWCNT) for OH radicals: A DFT study** **Meenakshi Malakar,** *Assam University, India*
10:40-11:00	**Title: Carbon Si composite for high energy density Li ion battery** **Indrajit Mukhopadhyay,** *Pandit Deendayal Energy University, India*
11:00-11:20	**Title: On harmonious chromatic number of total graph of central graph in general** **A. Amutha,** *The American College, India*
11:20-11:40	**Title: Impact of work function engineering in charge plasma based bipolar devices** **Mahendra Gaikwad,** *G H Raisoni College of Engineering, India*
11:40-12:00	**Title: Energy efficient architecture for mitigating the hot-spot problem in wireless sensor networks** **Sunita Varma,** *Shri G.S. Institute of Technology and Science, India*
12:00-12:20	**Title: Hybrid image processing model: A base for smart emergency applications** **Gunish,** *Indian Institute of Information Technology Kottayam (IIITK), India*
12:20-12:40	**Title: Causes of the Fracture of Some Rotary Pelletization Dies: A Case Study** **Amir Reza Kalani,** *Independant Scientist, Iran*
Lunch Break 12:40-13:10	

13:10-13:30	**Title: Mathematical modeling of a thermal converter with a cylindrical heat conductor and with a local heat source chosen on the basis of the scientific problem** **Matyakubova P.M.,** *1Tashkent State Technical University, Uzbekistan*
13:30-13:50	**Title: Detection of pathogenic bacteria using bacteriophages and plasmonic nanoparticles by lspr and sers: A brief review** **Farzaneh Moghtader,** *Translational R&D and Technology Center, Turkey*
13:50-14:10	**Title: Nanotechnology as a new risk in the world of work** **Sára Felszeghi,** *University of Miskolc, Hungary*
14:10-14:30	**Title: Laser beam in dispersion media, photons, axions** **V. Ogluzdin,** *Fgbun Institute of General Physics named after M. A. Prokhorov 19991, Russia*
14:30-14:50	**Title: Moiré diamanes and nitridanes – new 2D tetragonal atomic crystals: Modeling structural features and properties** **Leonid Chernozatonskii,** *Institute of biochemical physics, Russia*
14:50-15:10	**Title: Comments about the quantification of matter** **M. Fabre de la Ripelle,** *Université d'Orsay IN2P3, France*
15:10-15:30	**Title: Electrospun nanofibers decorated with metallic nanoparticles for various applications** **Teboho Clement Mokhena,** *Nanotechnology Innovation Centre (NIC), South Africa*
15:30-15:50	**Title: Impact of Iron pyrite nanoparticles sizes in photovoltaic performance** **Refka Sai,** *Université de Carthage, Tunisia*
Refreshment Break 15:50-16:10	
16:10-16:30	**Title: Activation energy tunability of electrical conduction mechanisms in ternary organic thin films** **Laura Hrostea,** *Alexandru Ioan Cuza University of Iasi, Romania*

16:30-16:50	**Title: KMC simulations of atomic redistribution in PCRAMs based on Ge-rich Ge-Sb-Te alloys** **A. Portavoce,** *Aix-Marseille University/CNRS, France*
16:50-17:10	**Title: Is the cell a digitally controlled system?** **Philip G. Penketh,** *Yale University School of Medicine, USA*
17:10-17:30	**Title: Advanced polymeric nanocomposite membranes for water treatment** **Abhispa Sahu,** *American Nano, LLC, USA*
17:30-17:50	**Title: RAI – Responsible Artificial Intelligence, a short analysis** **Fernando Buarque de Lime Neto,** *University of Pernambuco, Brazil*
17:50-18:10	**Title: When bacteria meet nanomaterials: nanosensors for the detection of microbial pathogens.** **Leslie Susana Arcila Lozano,** *Ciencia y Tecnología, Ciudad de México, México*
Closing Remarks	



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SCIENTIFIC ABSTRACTS

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Structure and application of lithium-ion endohedral [C60] fullerene

E. Kwon[1], R. Hatakeyama[2], K. Kawachi[3] and **Y. Kasama[3]**

[1]Research and Analytical Center for Giant Molecules, Tohoku University, Japan
[2]New Industry Creation Hatchery Center, Tohoku University, Japan
[3]Idea International Co, Ltd., Japan

Since the synthesis and characterization of lithium cation endohedral metallofullerene (Li+@C60, 1),1) several investigations have been performed on the application of 1 to functional materials.2) The essential structural feature of 1 is the presence of a lithium cation inside the spherical empty space of the C60 fullerene. However, previous research faced limitations in obtaining detailed structural information on 1 due to the low electron density resulting from positional and dynamic disorder of the Li+.

In this study, we investigated the structure of 1 using powder neutron diffraction at low temperature (3.7 K).3) The use of neutron diffraction allowed us to determine the precise structure of 1. As shown in Fig., the nucleus of the Li+ was found to be closer to the inner wall of the fullerene cage than to the center of its electron density. According to a Natural Bond Orbital (NBO) analysis, hyperconjugation of the spatially extended electrons could arise from an overlap of the vacant Li+ orbital with the π orbitals of the hexagonal moiety of the fullerene cage.

Furthermore, we will introduce terahertz spectroscopy, solid-state NMR, and the energy storage characteristics of a capacitor with 1.

1) Aoyagi, S. et al.; Nature Chemistry 2012, 2, 678, 2) For recent reports, see: K. Ohkubo et al.; Chem. Commun., 2013, 49, 7376, 3) E. Kwon et al.; Chemical Physics Letters, 2020, 801, 139678.

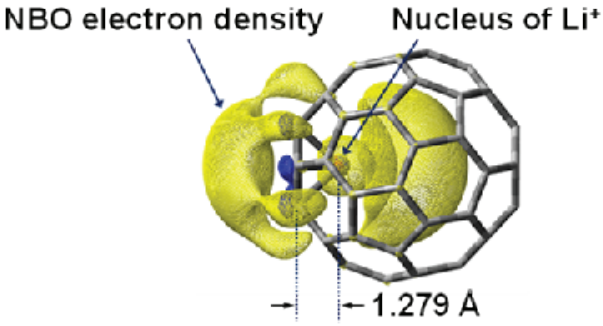

Fig. *The nucleus of Li+, as determined by the neutron diffraction study, was found to be closer to the inner wall of the C60 fullerene cage than to the center of its electron density.*

Biography

Dr. Eunsang Kwon is an associate professor at the Graduate School of Science, Tohoku University, Japan. He received his doctoral degree in Science from Tohoku University in 2001. From 2001 to 2005, he worked as a post-doctoral fellow at RIKEN Frontier Research System. Subsequently, he served as a research fellow at the Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, from 2005 to 2008. In 2008, he began his independent career as an Assistant Professor at the Research and Analytical Center for Giant Molecules at Tohoku University, and he was promoted to Associate Professor in 2015. His research interests encompass theoretical/computational chemistry, the structures and properties of nanoscale functional materials based on endohedral metallofullerenes, and their applications.

Advanced ZnO based piezo-phototronic optoelectronics

Wenbo Peng
School of Microelectronics, Xi'an Jiaotong University, China

Since its invention in 2010, piezo-phototronic effect has been widely used in piezoelectric semiconductor materials and optoelectronic devices, e.g., solar cells, light-emitting diodes, and photodetectors, for both fundamentally physical research and potential applications. However, so far, the most related researches are mainly focused on whether piezo-phototronic effect could modulate the devices' performance, and the reported piezo-phototronic effect induced enhancement is varying from a few dozen percent to thousands of percent. Why the piezo-phototronic effect could induce such different performance improvements in different optoelectronic devices? In some special cases, the piezo-phototronic effect even causes performance degradation. Therefore, it is of great significance to carefully investigate the role of the piezo-phototronic effect plays in different optoelectronic devices, which might possibly give us more clear understandings of the piezo-phototronic effect and further constructive suggestions of how to utilize it more effectively. In our recent works in the past a few years, we have systematically studied the piezo-phototronic effect in optoelectronic devices using ZnO as the piezoelectric semiconductor material, including: photodiodes with different device structures, thin-film transistors with different charge carrier concentrations, and heterojunctions with different energy band diagram alignments, to reveal the underlying physics in piezo-phototronic effect. Our experimental and theoretical results indicate that: (1) the charge carrier concentration in ZnO is of great importance, should not being too small or too large; (2) compared to isotype photodiodes, anisotype photodiodes are preferred; (3) energy band diagram alignment is also preferred since misalignment would cause negative effects when introducing the piezo-phototronic effect. At last, we give a systematic instruction on how to utilize the piezo-phototronic effect more effectively and our most recent research progresses about the experimental and theoretical results of piezo-phototronic and pyro-phototronic effects in multi-layered ZnO based optoelectronic devices.

Biography

Dr. Wenbo Peng is now an Associate Professor at School of Microelectronics, Xi'an Jiaotong University. He received his PhD degree in major of Electronic Science and Technology at 2016 and bachelor degree in major of Microelectronics at 2010, from Xi'an Jiaotong University. He has been a visiting scholar in School of Materials Science and Engineering, Georgia Institute of Technology from Aug 2014 to Jul 2016, working on the research fields of piezotronics and piezo-phototronics under the supervision of Prof. Zhong Lin Wang.

His research interests mainly focus on advanced low dimensional piezoelectric semiconductor materials, devices and physics, and novel intelligent sensing integrated chips. He has received several fundings from NSFC, Shaanxi Province and companies. He has authored and co-authored over 50 peer-reviewed journal publications in related research fields, parts of which are published on high quality international journals, including Advanced Materials, Advanced Functional Materials, Advanced Energy Materials, Nano Energy, ACS Nano, Nano Letters, etc. His publications have been cited over 2200 times, as documented at Google Scholar (h-index: 26). He has given several Invited Talks in renowned international conferences. He is the Fellow of International Association of Advanced Materials.

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Ultrasonically catalyzed gas sensor systems and their performance enhancement by ML algorithms

Junhui Hu

State Key Lab of Mechanics and Control of Mechanical Structures, Nanjing University of Aeronautics and Astronautics, China

High-performance gas sensing systems have wide application range covering human health diagnoses, food industry, IOTs, public security, air quality monitoring, etc., due to the merits such as point-of-care testing, easiness to operate, simple and light structure, low cost, etc. The speaker's research group proposed and experimentally confirmed the ultrasonically catalyzed gas sensing method in 2017, and then successfully applied it in high-performance gas sensing and single-sensor E-noses. This talk gives the detailed research results in this respect. The first part of this lecture includes principle of the ultrasonic catalysis in gas sensing, and basic structure and characteristics of the gas sensors catalyzed by gas borne ultrasound. In the second part, working principle and algorithms of ultrasonically catalyzed single-sensor e-noses, are described, as well as the structure, system design and gas discrimination performance. The algorithms applied in the E-noses include the k-method, R-C method and machining learning methods. It shows that the ultrasonically catalyzed gas sensors have much better sensitivity and lower detection limit than the conventional ones, and ultrasonically catalyzed single-sensor E-noses have strong capability of gas discrimination and concentration measurement.

Biography

Junhui Hu received his Ph.D. Degree from Tokyo Institute of Technology, Tokyo, Japan, in 1997, and B. E. and M. E. degrees in electrical engineering from Zhejiang University, China, in 1986 and 1989, respectively. Currently he works for Nanjing University of Aeronautics & Astronautics, China, as a full professor. His research interest is in ultrasonic sensors and actuators, ultrasonic nano fabrication, ultrasonic micro/nano/molecular manipulations, etc. He is a Chang-Jiang Distinguished Professor, China, and an IAAM Fellow. He authored and co-authored more than 300 publications, including more than 100 full SCI papers, two books, 1 editorial review in an international journal and more than 60 disclosed/empowered China and Japan patents. He is the sole author of monograph book "Ultrasonic Micro/Nano Manipulations: Principles and Examples" (2014, World Scientific). He has given more than 30 keynote/invited lectures at international conferences, and his research work has been highlighted by 7 international scientific media. He served lots of international conferences as a Technical Program/Organizing/Scientific Committee member, and was the chairman of five international conferences. He was awarded the title of valued reviewer by Sensors and Actuators A: Physical and by Ultrasonics, and won the Paper Prize from the Institute of Electronics, Information and Communication Engineers (Japan) as the first author in 1998. Presently, he is an editorial board member of four international journals, board member of Chinese Acoustical Society and member of its academic work committee, and deputy director of expert committees on electronic information materials and devices, and on Aerospace materials, Chinese national scientist think tank for materials and devices.

A low-cost synthesis and preparation technology of one-dimensional silicon carbide nanowires

Pengchao Kang, Qiqi Zhao, Jinrui Qian, Zengyan Wei, Wei Xue, Zhenlong Chao, Longtao Jiang and **Ziyang Xiu**

School of Materials Science and Engineering, Harbin Institute of Technology, China

In this study, we report a low-cost synthesis technology of silicon carbide nanowires via the thermal evaporation. The effects of growth temperature, silicon source modification on the product morphology and productivity in the preparation of SiC nanowires were investigated, and the growth mechanism of SiC nanowires was studied in detail. This study provides an important experimental and theoretical basis for the preparation of high-purity and ultra-long SiC nanowires in high productivity.

Biography

I am associate professor in the Department of Materials Science, the school of Materials Science and Engineering, China. I completed my Bachelors' Degree and Mater Degree from Northeast Heavy Machinery Institute, and I got my Ph.D from Harbin Institute of Technology. I have worked in North Carolina State University for one year as Visiting Scholar. I am focus on the metal matrix composites and nanomaterials preparation. I have published more than 70 research papers, I am a reviewer for more than 10 Journals, such as Carbon, Intermetallic, MSEA, J ALLOY COMPD, J Nanopart Res, Ceram Int, J Cryst Growth, coatings, etc.

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Construction of an excellent 7 mRNAsi-related gene model based on cancer stem cells for predicting survival outcome of cervical cancer

Huan Wu and **Yang Liu**

Department of Obstetrics and Gynecology, Chongqing Medical University, China

Background: Cervical cancer (CC) is one of the most frequent female malignancy. Cancer stem cells (CSCs) positively affect survival outcomes in cancer patients, but in cervical cancer, the mechanism of tumor stem cells is still uncertain.

Methods: RNA-seq data and related clinical follow-up of patients suffering from CC were from TCGA. Consensus clustering screened prognostic mRNAsi-related genes and identified molecular subtypes for CC. Based on the overlapping differentially expressed genes (DEGs) in subtypes, we employed LASSO and multivariate Cox regression to screen prognostic-related genes and established the RiskScore system. The patients were grouped by RiskScore, the prognosis was analyzed by the Kaplan-Meier(K-M) curve among the various groups, and the precision of the RiskScore was assessed by the ROC curve. Finally, the potential worth of RiskScore in immunotherapy/chemotherapy response was assessed by evaluating TIDE scores and chemotherapy drug IC50 values.

Results: We noticed that patients with low mRNAsi had a shorter survival and then identified three molecular subtypes (C1-3), with the C1 having the worst prognosis and the lowest mRNAsi. Finally, we identified 7 prognostic-related genes (SPRY4, PPP1R14A, MT1A, DES, SEZ6L2, SLC22A3, and CXCL8) via LASSO and Cox regression analysis. We established a 7-gene model defined RiskScore to predict the prognosis of CC patients. K-M curve indicated that low RiskScore patients had improved prognosis, and ROC curves indicated that RiskScore could precisely direct the prognostic evaluation for those suffering from the cancer. This was also confirmed in the GSE44001 and GSE52903 external cohorts. Patients were more sensitive to immunotherapy if with low RiskScore, and RiskScore exhibited precise assessment ability in predicting response to immunological therapy in CC patients.

Conclusion: CC stemness is associated with patient prognosis,and the RiskScore constructed based on stemness characteristics is an independent prognostic index, which is expected to be a guide for immunotherapy, providing a new idea for CC clinical practice.

Biography

Huan Wu, Docter of Medical Science,engaged in clinical, teaching and research work of gynecology and obstetrics for more than 10 years, published more than 10 articles, and was good at gynecological tumor surgery and treatment.

Nucleation and growth of nano-sized bubble on hydrophobic surfaces

Ho-Young Kwak
Chung-Ang University Seoul, Korea

Nucleation of nanoscale gaseous bubbles on hydrophobic surfaces was studied by molecular cluster model, which assumes that initial process for bubble formation is a cluster process of dissolved gas molecules in metastable solutions. Assuming nucleation rate being 1/cm2s, the number of molecules constituting the critical-size bubble evolved from a critical-size cluster, the lateral radius, and the curvature of the bubble depending on the liquid-side contact angle were obtained. At a contact angle of 160o, a critical bubble with a lateral radius of 0.51 μm and containing 1.7 million molecules is formed by supersaturation of 1.54, which is in reasonable agreement with the observation. This study showed that the size of the bubbles formed on the hydrophobic surface was highly dependent on the nucleation rates. Subsequent bubble growth was studied using the diffusion equation along with the obtained initial supersaturation value by the molecular cluster model. A slight supersaturation surrounding the surface bubbles after bubble formation ensures the long lifetime of the bubbles. In this study, heterogeneous vapor bubbles on smooth surfaces on the atomic scale was also considered using molecular cluster model. Vapor bubble formation in a liquid can be thought of as separating the intermolecular distance in the liquid state by the distance in the vapor state. The intermolecular interactions in a metastable liquid are assumed to be van der Waals. The boiling superheat calculated decreases with increasing contact angle. As the contact angle approaches 180o, the boiling superheat of water approaches the boiling point of 100 □. At a contact angle of 40°, which is a contact angle of water on a platinum surface, the boiling superheat with a nucleation rate of 1011 clusters/cm2s is about 556K (283□), which is close to the observed result. On the other hand, the boiling superheat of water on the Teflon AF surface was measured to be about 9°C because the contact angle is about 168°.

Biography

Ho-Young Kwak received his BS from the Seoul National University in 1971 and MA in Plasma Physics and PhD in Mechanical Engineering from University of Texas at Austin, USA in 1978 and 1981, respectively. He joined the ME Faculty, Chung-Ang University, South Korea in 1981 and served 35 years and is currently an Emeritus Professor there. His research interests are in bubble nucleation and dynamics, sonoluminescence phenomena, and exergy and thermoeconomic analysis for thermal systems. His books include Bubble Nucleation and Dynamics, published by Nova Science Publishers in 2019. He is a permanent member of the Korean Academy of Science and Technology.

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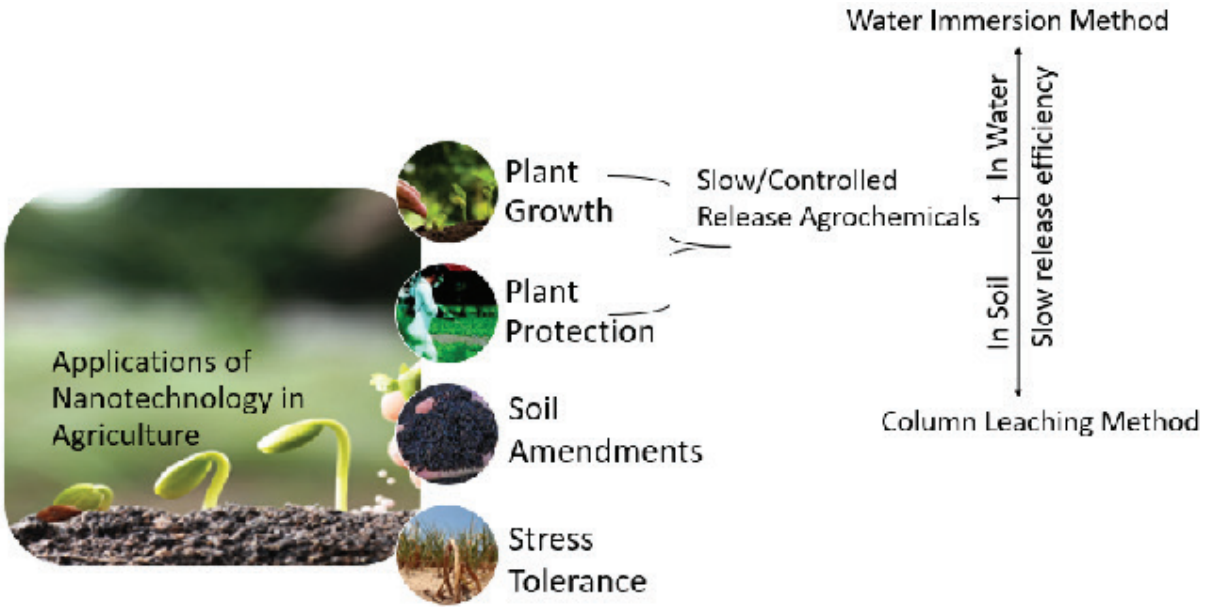
Exploring the feasibility of nanotechnology in controlled environment agriculture

Praseetha P Nair and **Feba Mohan M**
Government Engineering College, India

Agriculture plays a major role in meeting livelihood and contributes to the GDP of developing countries. The various techniques conventionally used in farming are highly input demanding methods and are insufficient to meet the challenges faced by agriculture industry. The methods followed in conventional agriculture sector depend on extensive usage of resources in the form of land as well as capital, widespread application of chemical fertilizers, pesticides, herbicides etc. These practices cause pollution to the environment, soil and ground water, as well as health issues to farming community to a severe extend. It is high time to incorporate modern and smart technologies in agriculture industry to preserve our ecosystem without compromising crop production. Precision farming and Controlled Environment Agriculture are the ideal concepts that are introduced which propose maximum production with optimum utilisation of resources. The science of nano-biotechnology is the prospective and ultimate tool for creating revolutionary transformations in the current scenario in agriculture industry there by fulfilling the dream notions of precision farming to make sustainable agricultural fields. The excessive use of agrochemicals can be controlled by the application of targeted and slow release of ingredients. Agrochemical formulations usually consist of nutrients or ingredients in the core area with outer cover, which is made of bionanocomposites, where the outer cover degrades over time, facilitating the



controlled release of nutrients to the soil. Bionanocomposites exhibit enhanced characteristics, being formulated from bio-derived compounds and nanomaterials. This comprehensive review highlights the importance and scope of nanotechnology and its applications in agriculture, precision farming, smart delivery system of agrochemicals, methods to evaluate its controlled release efficiency in water and soil.

Nanomaterials involved in the smart delivery systems of agrochemicals	Applications
Chitosan nanoparticles	Nano fertilizers
Carbon nanotubes	Nano fertilizers
Bentonite coated NPK	Controlled release fertilizers
Nano Zeolite as carrier	Slow or controlled release fertilizers
Starch and active ingredient bio nanocomposites	Nano pesticides
Polymers and active ingredient bio nanocomposites	Nano pesticides
Graphene	Nano sensor
Nano biochar	Soil amendments

Biography

Praseetha P Nair, Associate Professor in Chemical Engineering in Government Engineering College, Thrissur, Kerala, has 20 years of teaching experience. She completed PG from Indian Institute of Technology, Madras, India in Chemical Engineering and PhD from Cochin University of Science and Technology, India, in the area of Polymer Technology. Her research interests include Nanomaterials, Biomaterials, Polymers etc. She has received Research Project fundings from various agencies like Kerala State Council for Science, Technology and Environment, Government of Kerala, Centre for Engineering Research and Development, Government of Kerala and Technical Education Quality Improvement Program. She received many laurels which includes University rank for UG from the University of Kerala in the year 2002 and D L Saraswathi Memorial Award (Silver medal and Cash Award) for PG from Indian Institute of Technology, Madras in the year 2009. She has around 55 publications which includes International Journals, Book Chapters, International and National Conferences.

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Cellular automata-based multi-bit stuck-at fault diagnosis for resistive memory

S. Sarkar[1], B. K. Sikdar[2] and M. Saha[3]

[1]The Neotia University, India
[2]Indian Institute of Science and Technology, India
[3]National Institute of Technology, India

Computations and computability not only impact to knowledge society but also to common people of our society. A numerous single-core and multi-core processor designs are evolved to meet the demand of enhanced computing speed and computing capacity. Advancement in Very Large Scale Integration (VLSI) technology evolves through nanotechnology scaling to influence multidisciplinary fields of engineering. Therefore, It also enhances the processor design options with emerging technology. Advance processor designs can be implemented with complex memory-processor interaction and increased scalable memory capacity. Almost all System on chips (SoCs) are nowadays having on-chip multi-layer (L1-L3) cache to avoid Von Neuman's bottleneck. But as the number of cores increases, the area occupied by the on-chip cache also increases with increasing power consumption.

Emerging nonvolatile memory (eNVM) technology gives area shrinkage as well as less power consumption compared to SRAM/DRAM technologies. Resistive memory is a promising eNVM technology with ultra low leakage power, area shrinkage, low read latency, low read energy, fits for scalable architectures of multi-core, many-core and more specifically chip multiprocessors (CMPs) construction of on-chip cache. But it suffers with endurance and reliability issues under repetitive writes. Stephan Wolfram proposed a realistic Cellular Automata (CA) to address physical and biological systems. Different CAs are proposed to address various issues in VLSI domain. So, CA is used to model discrete dynamical system such as memory subsystem. Here, to address the write issues in on-chip cache, CA is used. An efficient fault tolerant system is proposed to handle the write issues of CMPs using CA.

Biography

Sutapa Sarkar received her PhD and M.Tech degree from Indian Institute of Engineering Science and Technology, Shibpur, West Bengal, India from the department of Computer Science and Technology and Information Technology. Presently, she is working as Assistant Professor of Computer Science & Engineering department with The Neotia University, West Bengal, India. Previouly, she was working as Head of the Department (Assistant Professor) in Seacom Engineering College in the department of Electronics & Communication Engineering. Her academic career in Engineering touched 19 years. She has catered her service as an Innovation Ambassador in her Institute. She has organized several on-line and off-line seminars. She is also a Corporate Member of Institution of Engineers (India). She is having research interests in Computer Architecture, Digital Signal processing, health informatics, recent research trends in VLSI and on the development of Cellular Automata theory and its applications.

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Synthesis of non-selective sorbent modified with carbon nanomaterials and their hemocompatibility

M. Opoku[2] and **A.P Iykov**[1]

[1]*Research Institute of Clinical and Experimental Lymphology, Russia*
[2]*Novosibirsk State Research University, Russia*

A search for promising nonselective sorbents based on composite materials, including using carbon nanomaterials, is an urgent task of resuscitation and toxicology. The synthesis and estimation of the biocompatibility of sorbents based on gamma-aluminum oxide and polydimethylsiloxane, modified with single-walled carbon nanotubes or carbon nanofibers, are carried out. It is detected that the synthesized sorbents adsorb low and medium molecular weight substances on their surface. Moreover, it is found that there is a toxic effect on red blood cells (hemolysis) occurs with prolonged exposure (120 h), short-term (5 min) exposure of the components of human peripheral blood with the sorbents leads to a loss in the number of platelets and leukocytes, mainly granulocytes, of mononuclear cells of the peripheral blood, as well as short-term and long-term contact of the blood components with the samples of sorbents contributes to a decrease in the metabolic activity of the cells and the activation of nitric-oxide production. Based on the results obtained, it can be assumed that the sorbent based on γ aluminum oxide and polydimethylsiloxane, modified with carbon nanomaterials, is promising for the development of nonselective sorbents.

Biography

Maxwell Opoku is a from Novosibirsk State Research University Russia, department of Medicine. With an interest in toxicology and Internal medicine. He possess a strong leadership and communication skills. And has great passion for medicinal research.

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Effects of Boron / Nitrogen / Phosphorus doping on the scavenging action of armchair single-walled carbon nanotubes (armchair-SWCNT) for OH radicals: A DFT study

Meenakshi Malakar and **Pradeep Kumar Shukla**

Department of Physics, Assam University, India

Abstract – Hydroxyl radical (OH radical) is the most harmful free radical amongst the Reactive Oxygen Species (ROS) responsible for numerous diseases of DNA damage like mutagenesis, carcinogenesis and ageing. Therefore, it is important to find a suitable scavenger for OH radical. In the present contribution, we aim to investigate the ability of pristine armchair-SWCNT and B/N/P-doped armchair-SWCNT to scavenge OH radicals using DFT calculations. The calculations reveal that the B/P-doped armchair-SWCNTs can act as a better scavenger for OH radical compared to pristine armchair-SWCNT but N-doped armchair-SWCNT does not act as a better scavenger for OH radical compared to pristine armchair-SWCNT. Furthermore, the developed scavenger is examined in terms of large-scale availability, biocompatibility, conductivity, stability and reactivity. For both in vivo and in vitro studies, the work is found to useful for enhancing SWCNT as a free radical scavenger.

Biography

Ms. Meenakshi Malakar is pursuing her PhD in Physics from Assam University, Silchar (a central university in India). She has more than 5 years of rich research experience in computational physics. Her research interest includes theoretical interaction of biologically important molecules with various nanotubes like carbon nanotubes, boron nitride nanotubes etc. for biomedical applications. Her research interest also focusses on understanding the cause and mechanism of cancer formation in living cells using simulation and modelling studies. Her supervisor is Dr. Pradeep Kumar Shukla, who is a prestigious Raman Postdoctoral Fellowship Awardee during the year 2013.

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Advanced Nanotechnology & Nanomaterials
September 14, 2023

Carbon Si composite for high energy density Li ion battery

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Most potential negative electrode material for Li ion battery, Si are difficult to employ on a wide scale because of two reasons: (a) a 300 percent volume change during lithiation, and (b) silicon degradation after multiple charging and discharging cycles. These drawbacks may be overcome by coating silicon nanostructures with the carbon(C), which also enhance the electrochemical performance of LIBs [1-2]. This study investigates low-cost techniques such as chemical synthesis and electrochemical deposition for creating Si/Carbon composite materials for Li-ion batteries. In chemical synthesis, Si nanoparticles are first synthesised by heating SiO_2 with magnesium in the open air (no inert atmosphere is used), followed by coating with carbon using a carbon source like sucrose. While in electrodeposition, we prepared Si/C composite by depositing Si and Graphene simultaneously over copper substrate by using water contaminated $BMImTf_2N$. The structure of the samples is characterized by XRD, Raman spectroscope, SEM, and HRTEM. The primary results of electrodeposited Si/C show the formation of highly crystallized Si nanoparticles with particle size of ~200 nm. Electrochemical characterization shows that an electrode has an initial lithium storage capacity of 1702.9 mAh g^{-1} at a current of 100 mA g^{-1}. The storage capacity decreases to 975.7 mAh g^{-1} after 100 cycles. On other hand, electrochemical characterization of chemical synthesised Si/C shows that an electrode has an initial lithium storage capacity of 2102 mAh g^{-1} at a current of 100 mA g^{-1}. The storage capacity decreases to 775.7 mAh g^{-1} after 100 cycles. Since these methods are simple and easy to scale up, with further improvement, the method has potential for use in large scale production Si/C composite anode materials at low cost.

Biography

Dr. Indrajit Mukhopadhyay has been working as a Professor in the Dept. of Solar Energy, Pandit Deendayal Energy University, Gandhinagar, Gujarat, India, since 2011. He worked in CSMCRI, Bhavnagar (CSIR, India) as a principle scientist till 2003. He received the prestigious CSIR rural technology award 2008 and Vikram Sarabhai Award 2006 as a key team member for his excellent contribution in the field of chemical sciences while working at CSMCRI (CSIR), Bhavnagar. He received VIRA Distinguished Scientist in Solar Energy 2019 (Venus International Science Foundation, Chennai, India). He has been awarded JSPS fellowship in 1999 and worked as visiting scientist at Nagoya Institute of Technology during 2009. He has published 150+ papers in international journal and has five US patents and one Indian patent in his credit. The contribution of Prof. Mukhopadhyay can be found in detail: https://scholar.google.co.in/citations?user=FUmlpokAAAAJ&hl=en&oi=ao. He can be reached at Indrajit.m@sse.pdpu.ac.in

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On harmonious chromatic number of total graph of central graph in general

A. Amutha

The American College, India

Graph theory is a part of discrete mathematics that has the most applications in real life. Indeed, even with the advancement of data and correspondence innovation, and the improvement of other social elements, the utilization of graph theory is progressively taken into account. Graph theory is useful in a variety of areas, including switching theory, logic architecture, computer graphics, operating systems, compilers, information organization and retrieval. In computer science, graphs are utilized to describe communication systems, database systems, artificial intelligence, information processing and so on. Combinatorial problems have become more important recently in the study of labelling, coverage, connectivity and fault tolerance in communication networks. There are many optimization problems that associates network with graph theory which are either NP-Complete or NP-Hard. In line of thought The Harmonious Chromatic Number Problem (HCNP)is one among the problem. The HCNP in communication networks consists of finding the minimum number of colors that may be interpreted as giving codes to network nodes so that each communication connection can be differentiated. A new technique have been used to solve and find the exact solution for certain finely structured graphs and HCNP for most of the central graph of parallel architectures including honeycomb, butterfly, hypercube, mesh-based network and torus network which are classified under Cayley graphs are provided. The exact solution of HCNP for total graph of central graph of non-Cayley graphs such as generalized Petersen graphs, silicate network, Jahangir graph, bloom network, uniform theta graph and snake derived networks are also computed. In this talk I propose to bring out the importance of the HCNP and how to find out the exact solutions of HCNP for certain interconnection networks.

Biography

Dr. A. Amutha served as the Guest Lecturer in the Department of Mathematics, Gurunanak College, Chennai in a year then she joined the Department of Mathematics, Sathyabama University in the year 2005. She guides Research scholars leading to Ph.D degree in Graph Theory. To her credit she has produced Four Ph.D candidates and number of research publications both in National and international Journals. She is guiding 2 research scholars under Madurai Kamaraj University. She has presented research papers in Jordan University, Malaysian University and in Indian Universities. She served as Reviewer in Special issue of International Journal of Pure and Applied Mathematics, Academic Publications, Bulgaria, 2016. She is acting as Doctoral Committee Expert in Madras University and Sathyabama University Chennai. She served as M. Phil and Ph.D Thesis Evaluater and Examiner in Indian Institute Of Technology (IIT), Chennai, Madras University, Chennai, Bharathiyar University Coimbatore, Mahathma Ghandhi University, Kerala.

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Impact of work function engineering in charge plasma based bipolar devices

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[2]NIT Patna, India

In this paper, we have explored and justified the reason behind the degradation in the cutoff frequency of the bipolar transistors evolved from the charge plasma concept. It has been observed that if the work function difference present between the emitter metal contact and silicon is greater than or equal to 0.68 eV (ϕ_m - ϕ_{SI} = 4.05 eV - 4.73 eV), it results in increment in the base width which is the inverse of the cutoff frequency. On top of this, two dimensional TCAD simulations of the different bipolar devices also demonstrate the same base width widening effect into the intrinsic region which is present between the base region and collector region. Apart from this, if this difference is exactly equal to 0.5 eV (ϕ_m - ϕ_{SI} = 4.23 eV - 4.73 eV) then the base width widening effect can be completely eliminated from the bipolar devices base on the charge plasma.

Biography

Dr. Mahendra Gaikwad did his BE in Electronics Engineering. He did his M. Tech in Communication Engineering from Indian Institute of Technology (IIT), Bombay in 1998. He did his PhD on "Network -on-Chip Architecture using Perfect Difference Network Topology" from VNIT, Nagpur. Presently he is working as Professor & Head, Department of Information Technology, G H Raisoni College of Engineering, Nagpur and Mentor of GHRCE's Nano-Satellite Program. He is also handling the responsibility of Project Coordinator of GHRCE's Nano-Satellite "GHRCEsat". He is instrumental for development and design of GHRCE's Nano-satellite "GHRCEsat" for Technological demonstration of Inter & Intra communication among Nano-satellite in LEO for satellite constellation. He is instrumental for set up the GHRCE Ground Station to monitor the live status of the Nano-Satellite. GHRCEsat has been successfully launched from Satish Dhawan Space Centre, SHAR, Sriharikota, India using PSLV-C51 launch vehicle on 28th February 2021 at 10.24 Hrs by Indian Space Research Organization (ISRO) in Lower Earth Orbit. He has published 120 research papers in various International and National Journals & Conferences. He has delivered more than 80+ expert lectures, keynote address in various International & National Level Conferences. He is also the recipient of prestigious National Award "Rashtriya Vidya Saraswati Purskar" for outstanding achievement in the field of Engineering & Technology. His research areas of interest are Network- on-Chip Architecture, Perfect Difference Network Topology, Signal Processing, DIP & Speech Analysis and Synthesis.

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Energy efficient architecture for mitigating the hot-spot problem in wireless sensor networks

Sunita Varma[3], Deepika Jain[1] and **Piyush Kumar Shukla[2]**

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[2]Rajeev Gandhi Technical University, India
[3]Shri G.S. Institute of Technology and Science, India

In wireless sensor networks (WSNs), mutual coordination of cluster heads (CHs) is essential to transmit their data towards the sink node through many-hop fashion. As a result of this activity, the CHs in close vicinity to the BS are overburdened with massive relay traffic, which establishes a hot-spot problem. In this paper, in order to capture the hot-spot problem, harris hawk optimization (HHO) based algorithms have been proposed, jointly termed as HHO-UCRA (HHO build on unequal clustering and routing algorithms). In the first step, CH selection mechanism has been proposed based on HHO based technique. Afterwards, the derived CH Assignment function is used for the cluster formation. Finally, efficient hawk encoding schemes and novel fitness functions of HHO based technique have been formulated for both the algorithms. In the extensive simulation, HHO-UCRA is executed with varying number of sensors and CHs for all the WSN scenarios. Thereafter, the proposed algorithm is evaluated with some recent existing routing approaches and standard meta-heuristic based approach known as PSO-UCRA, to show the efficiency in terms of benchmark indicators of WSNs, such as network energy consumption, lifetime of network, convergence rate, data packets received by the BS and the number of alive nodes.

Biography

Dr. Sunita Varma's biography

Born in 1969 at Indore a city in Madhya Pradesh, a central India Province, Ms. Sunita has brought up and educated in the same city. She obtained B.E. (Electronics & Telecommunication, 1991) and M.E. (Computer Engineering, 1998) from a very reputed Engineering college, Shri. G.S. Institute of Technology and Science, Indore. She had been awarded Doctoral degree from the local university named as Devi Ahilya university, Indore in 2013.

At present she is working as a Professor and head in the Department of Information Technology at Shri. G.S. Institute of Technology and science, Indore. Her total teaching experience, however, is about thirty-two years. She has taught to undergraduate and post graduate classes, subjects like computer networks, Mobile Computing, Cloud Computing, Big Data analytics etc. Her field of interest Cloud Computing, Big Data analytics, Data Science, Data Science etc. She has supervised the various research projects of UG, PG students and guiding Ph.Ds in the area of cloud computing, IOT, Block chain. She has published several research papers in international conferences and journals in the field of mobile ad hoc networks, Cloud Computing, image processing, Block Chain, IOT and Big Data analytics etc. She is professional member of several international bodies like IEEE and life member of Institute of Engineers. Three patents are granted on her name.

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Hybrid image processing model: A base for smart emergency applications

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Abstract Image processing has led its applications to scale to almost all areas encompassing the emergent interdisciplinary fields of computers, electronics, mechanical, civil, and more. There are several discrete models in image processing to identify characteristic of an object under surveillance. In smart emergency applications, accuracy and precision on attributes of these objects are paramount. Hence there is a need to enhance the image processing algorithms used to measure an object's distance, size, and color from any altitude. The paper demonstrates Hybrid Image Processing Model (HIPM) using Triangle similarity, Pixel Per Metric (PPM), CIELAB color space, and Douglas-Peucker algorithm to compute the distance of an object from the camera, the size, color, and shape of an object from the image, respectively. This work emphasises on leveraging image processing techniques for assisting emergency aircraft landing. Results were obtained with five real-time image sets, each consisting of 50 images, and proved HIPM is efficient and reliable, with an accuracy of 99.84% and a mean error rate of 0.08. This work also discusses the model's capability to function in accordance with the need of autonomous vehicles and military events.

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Causes of the fracture of some rotary pelletization dies: A case study

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[1]*Independent Scientist, Iran*
[2]*Academic Center for Education, Iran*

Three similarly-manufactured but differently-employed pellet mill dies of X46Cr13 (420C) stainless steel were broken into several parts. To determine the causes of fracture, material characteristics (such as microstructure) and features of crack faces were investigated. It is figured out that sensitization, which is the existence of continuous carbides on the prior-austenite grain boundaries, has taken place both in the dies and the as-received primary rings. In addition, studies on the crack faces reveal the occurrence of fatigue, corrosion, and intergranular fracture. It can be concluded that corroded sites of die 1 and sharp edges of dies 2 and 3 act as fatigue initiation spots, and final crack growth takes place mostly by intergranular fracture, owing to the presence of continuous carbides. The results show the importance of microstructure control for primary rings, design modification for the dies to reduce stress concentration, and cleanliness of the dies in non-operating periods.

Biography

I hold M.S. in Materials Engineering – Metal Forming from Sharif University of Technology. My main scopes of activities are failure analysis of industrial components, simulation by Finite Element Analysis (FEA), and die design. I am teaching, researching, running projects and giving advice on the above-mentioned fields both independently and by working closely with several companies and universities. I also have founded an educational center for metal forming and die design.

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Mathematical modeling of a thermal converter with a cylindrical heat conductor and with a local heat source chosen on the basis of the scientific problem

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[2]Professor of the Department of Metrology, Tashkent State Technical University, Uzbekistan
[3]Senior Lecturer of the Department of Metrology, Tashkent State Technical University, Uzbekistan

The paper deals with the issues of the functional diagram and justification of the efficiency of thermal converters for controlling the moisture content of the flow of liquid materials. In addition, two main types of physical models were identified in the work based on a pipeline section with radial holes, in which cylindrical probes with heating and temperature-sensitive elements are located across the flow of liquid material: with concentrated and distributed heat sources.

1. Based on the analysis of a generalized functional diagram and justification of the effectiveness of thermal converters for monitoring the moisture content of liquid materials, as well as on the basis of a pipeline segment with radial holes in which cylindrical probes with heating and temperature-sensitive elements are located across the flow of liquid material, two main types of physical models are identified: and distributed heat sources.
2. A mathematical model of thermal converters of moisture content of liquid materials with cylindrical heat pipes with concentrated and distributed heat sources based on matrix methods of thermal quadripoles has been obtained and analyzed.
3. It is shown that for the development of designs of thermal converters of moisture content of liquid materials, the most suitable are thermal systems with distributed heat sources based on a segment of a pipeline with radial holes in which tubular probes with cylindrical temperature-sensitive elements are located across the flow of liquid material, on the surface of which a heating winding is wound. element, which significantly increases their sensitivity, speed and reliability allows the use of standard semiconductor temperature-sensitive elements.
4. The obtained mathematical models of thermal converters with concentrated and distributed heat sources were analyzed and experiments were carried out, their suitability for analyzing the main characteristics, as well as for developing a methodology for designing thermal converters for moisture content of liquid materials, was revealed.

Biography

Matyakubova Parakhat Meyliyevna, doctor of technical sciences, professor Born in 1960 in Urganch, Khorezm region. She graduated from the Tashkent Institute of Electrotechnical Communication in 1985, majoring in "Automatic Electrical Communication". She started his career in 1983 as an engineer of the Communications Department of Urganch city, Khorezm region. Since 1991, she worked as a senior teacher and associate professor at Urganch State University, and later as an associate professor and scientific secretary at the Urganch branch of Tashkent University of Information Technologies. In 2010, she worked as an associate professor of Tashkent State Technical University, since 2012, as a professor of this educational institution, since 2013, as the head of the department. Parakhat Matyakubova trained many students in the fields of metrology, standardization and product quality management, technical regulation, and achieved scientific achievements together with them. She won prizes in several international competitions. In particular, she regularly participated in the "KIWIE - 2018", "KIWIE - 2019", "KIWIE - 2021", "KIWIE - 2022" exhibitions held in the Republic of South Korea on behalf of women inventors of the Republic of Uzbekistan, and won a 4-time gold medal and grand prix in 2021. was in addition, she participated in "The 4th International Invention Innovation competition in Sanada, ICAN 2019 Toronto International Society of Innovation and Advanced Skills (TISIAS) ICAN 2019" - the 4th International Invention Innovation competition held in Toronto, Canada, and won the gold medal and was recognized as "Expert of the Year". Under her leadership, memorandums were signed with higher education institutions in Russia, South Korea, Germany, Canada, Belarus, Ukraine, Latvia, the United States of America, France, Kazakhstan and Turkey. She is also preparing educational and methodological complexes in cooperation with foreign scientists.

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Detection of pathogenic bacteria using bacteriophages and plasmonic nanoparticles by LSPR and SERS: A brief review

Farzaneh Moghtader[1,2], Ali İhsan Serbetci[1,2] and **Erhan Biskin[1,2]**

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[2]NanoBMT: Nanobiyobiyomedtek Biyomedikal ve Biyoteknoloji San. Tic. Ltd. Sti., Turkey

Food and water borne diseases are among the most serious and costly public health concerns worldwide. According to WHO millions of deaths occur annually due to food and water-borne diseases mostly caused by pathogenic bacteria including Escherichia coli, Salmonella, Staphylococcus, and many others, even in developed countries - which is a very scary scenery. In addition, the number of antibiotic-resistant bacteria is rapidly increasing - has already raised above very dangerous levels - which is even much more frightening. Monitoring food and water quality has therefore been recognized as one of the most important priorities globally.

Current pathogen detection methods include: (i) microbiological techniques (conventional culturing); (ii) nucleic-acid based (e.g., PCR and DNA hybridization using oligonucleotides as bio-recognition elements - bio-probes) and (iii) immunological (e.g., ELISA - using specific antibodies as bio-probes). Using bacteriophages as bio-probes alternative to antibodies and nucleic acids for bacterial detection is a very unique approach and that have been proposed rather recently. Bacteriophages are viruses which only infect bacteria, with excellent host selectivity. Bacteriophages are not only the most abundant biological entities but also probably also the most diverse ones. They may be very specific even at serotype levels, could be easily propagated therefore quite in expensive and have long-shelf life.

Bacteriophages have been used for specific detection of target bacteria by using different bio-sensing platforms which are mainly treated in two categories: (i) using labels (including fluorescent, luminescent, enzymes, electrochemically active labels, etc.), (ii) label-free systems (QCM, SPR, Ellipsometer, Raman and Mass spectrometers, etc.). Almost all of technologies mentioned above have been applied for detection of pathogens by using bacteriophages with different extent and success. The challenging objective is to develop enhanced detection technologies with high levels of reliability, sensitivity, and selectivity with short assay times.

In recent year due to the "size and shape-dependent" properties metallic, especially gold and silver nanoparticles have been extensively studied in wide variety of applications. Gold nanorods (GNRs) are rod-shape nanoparticles which could easily produced with different aspect ratios (dimensions) - therefore different plasmonic properties. Their unique optical and physical properties have allowed using them for development of bio-sensing platforms mainly as surface signal enhancers.

Here we briefly review detection of pathogenic bacteria by using as selective bio-probes together with GNRs, by focusing LSPR and SERS techniques – using also our experiences in the field.

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Nanotechnology as a new risk in the world of work

Sára Felszeghi

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It covers a wide range of fields of nanotechnology, applied science and technology, and disciplines such as colloid chemistry, semiconductor physics or supramolecular chemistry collaborate. It has achieved or promises to achieve breakthroughs in areas such as materials, nanoelectronics, healthcare, pharmaceuticals, energy, biotechnology, information technology, and national defence, thereby reaching a wide range of its working world, both in terms of production, use and waste management. In all areas, the main focus seems to be on potential benefits, and the risk factors associated with contamination and unforeseen health problems are being overshadowed. A difficulty is the general lack of high-quality exposure data for both humans and the environment. Current chemicals legislation does not help with risk assessment either, because, for example, it does not differentiate in terms of size, which determines the properties and health effects of nanomaterials!

For some time now, scientists have been engaged in debates about nanomaterials, which are precisely about contamination and unforeseen health problems, and which are fundamentally changing the classical view of occupational health and safety with regard to nanomaterials. For example, exposure times and limit values, emerging occupational diseases as new diseases, etc. need to be reconsidered. Research to identify the risks of nanomaterials to health and to develop methodologies for appropriate health/OSH measures and new diagnostic procedures should be accelerated. A fundamental issue is to extend the laws established for macromaterials to nanomaterials (e.g. providing an information sheet for each nanomaterial, including how to apply the precautionary principle!). The new approach to occupational health should fundamentally encompass both risk assessment and regular health surveillance of workers, which should be extended over a longer period ('follow-up document'). Non-specific medical examinations for workers exposed to nanoparticles should be developed to enable early detection of health impairments, regular collection and analysis of data, as well as occupational health promotion programmes with the potential to protect the health of these workers.

A famous Hungarian writer László Németh wrote:

The real strength of a society lies not in its rocket-like talents, but in the values of ordinary people working at ordinary tasks in society..."

Our never-ending task is to preserve that value also in the case of workers exposed to nanomaterials!

Biography

Member of the European Health and Social Committee, representative and deputy of the Workers' Group of the Management Board of EU-OSHA. University professor, specialist and inspector in Occupational Medicine, leading the Healthcare and Methodology Centre of the University of Miskolc, awarded Best practice in Occupational Healthcare by European Network for Workplace Health Promotion. licensed doctor EOQ MNB Quality System Manager.

Actively involved with several ETUC, ETUI and EU-OSHA projects, member of the European Association of Schools in Occupational Medicine. Health professional leader of 11 modules of the project GINOP-5.3.4-16-2017 "Health and safety at work" Knowledge provider in the CEI KEP/ Ref: No. 304.4.22-20 project "Improving Occupational Health and Safety System in Republic of Moldova".

Major honours

Imre Tóth Memorial Medal - Hungarian Scientific Society of Occupational Health (2007)

Pro Urbe Award - City of Miskolc (2014)

László Batthyány-Strattmann Award - Ministry of Human Capacities of Hungary (2016).

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Laser beam in dispersion media, photons, axions

V. Ogluzdin

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With the advent of lasers, light beams in the medium have become a common tool in the hands of the experimenter. With their help, success has been achieved in understanding the processes of interaction between radiation and matter. The use of the axion allows us to give a clear qualitative and, in some places, quantitative picture of the interaction of radiation and matter.

According to Primakov [1], the annihilation of two quanta (photons) in the field of the atomic nucleus can lead to the birth of the axion - A0:

$$h\nu + h\nu = A^0 = h\nu_{ij} + h\nu_{pl} \quad (1),$$

where:

h v is the energy of quanta (photons) of light radiation used to pump the dispersion media,

v is the frequency of this radiation;

h vpl is the energy of quanta (photons) of PL radiation (one of the components of the broadened radiation spectrum at the output of the investigated DM or one of the components of the angular radiation spectrum at the output of the investigated DM),

h v i j is the energy of quanta absorbed by the medium (determined by the difference between the energy of the virtual level - i and the energy of the level j).

An electron abandoned by a pair of pumping photons to the virtual level i in the process of non-radiative relaxation (heating of the medium) goes to one of the real levels - j, from where it returns to its initial state with the emission of a nev photon. The return of electrons to the initial state is associated with 1) the emission of PL, 2) the broadening of the spectrum, 3) the appearance of the components of the angular spectrum. The number of real levels in the atom is large. The set of these levels in (1) corresponds to the index j. The broadened frequency spectrum at the output of the medium [2-3] indicates this.

Let's list the processes for which it turned out to be interesting and useful, in the author's opinion, to involve the axion model. This is the scattering of light in the dispersion media, including scattering in the air into a solid angle of 4 π steradian. These are the processes of interphoton interaction of mutually intersecting light beams in the dispersion media, photoluminescence, broadening of the radiation spectrum at the output of the media. To explain the cone Cherenkov structure of the

angular spectrum, it will be successful to attract an axion whose propagation velocity is greater than the phase velocity at which photons move in the medium.

The traditional, according to Bohr and Einstein, scheme of the processes of interaction of radiation and matter: 1) absorption of radiation, 2) spontaneous emission of radiation, 3) forced emission of radiation in the absence of resonance between the pumping frequency and the frequencies of electronic transitions in the doping medium atoms complements the process of photon annihilation with subsequent axion decay.

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Moiré diamanes and nitridanes – new 2D tetragonal atomic crystals: Modeling structural features and properties

L. Chernozatonskii, A. Artyukh, V. Demin and **A. Kochaev**
Institute of biochemical physics, Russia

Currently, much attention is paid to 2D structures named as diamanes in first predicted paper [1]. These diamond-like films formed from bi-graphenes functionalized H (or F)-atoms are being synthesized recently and therefore they raised high hopes about their appropriateness for nano- electronic and optics devices as discussed in the last reviews [2,3]. However, at present, not only graphene layers, including twisted ones, but also layers of other 2D crystals are being successfully studied.

Here it is present the DFT computation results of new class of sp3-hybridized films based on twisted nearly 30o bilayers of bigraphene or hexagonal nitrides (h-MN (M = Al, B, Ga). two sides functionalized H (or F) atoms These materials can be attributed to a class of structures of twisted at an angle 2D layers, the study of which is called twistonics. It was choosing different variants more energetically stable films including 2D quasicrystals based on twisted 30o bilayers [4] and films based on twisted G/BN bilayers [5]. We consider atomic and electronic bands structures, high stiffness mechanical properties and up to ultra-low thermal conductivity of Moiré diamanes and nitridanes [6].

Between considered 2D materials there are semiconductors and dielectrics whish broad values of energy gaps and resonances of electron density of state. These properties are differed from 3D diamond and cMN crystals. These materials will be interesting to use as elements of nanoelectronic and optoelectronic and devices with new properties that differ from the existing ones. Moreover, it seems promising to further study the nitride materials for piezoelectric and photoluminescence applications.

Biography

Leonid Chernozatonskii - head of nanomaterial modeling group Institute of Biochemical Physics, Russian Academy of Sciences. In 1967 he graduated from the Moscow Engineering Physics Institute. Previously, he investigated: parametric acoustoelectronic phenomena in semiconductors in an alternating electric field; features of "phonon focusing"; the effect of phonon transition radiation; features of acoustic-optical interaction in crystals and superlattices.

Recently the main results lay in research of the nanostructures and their properties: carbon nanotubes (in particular, synthesis CNTs on substrates, high electron emission from CNTs, a correlation between metal catalyst particle size and multilayer CNT growth); the structures of superhard 3B polymeric fullerites; a new class of nanotubes and fullerenes from diborides, boron and oxides, their properties; structures of topologically coupled carbon nanotubes and similar porous graphene bilayers.

He predicted 2D diamond-like structures, called diamanes, which were confirmed experimentally. His current interests are modeling moiré diamond-like structures and their unique properties.

Comments about the quantification of matter

Michel Fabre de la Ripelle
Retired from CNRS, Université d'Orsay IN2P3, France

The Hyperspherical quantum mechanic is an extension to the many dimensional space of the Schrödinger equation where the Hyperspherical potential harmonics are substituted for the spherical harmonics and the second order differential operator associated, according to the weight function algorithm, with the Hyperspherical polynomials basis.

Numerically it has be found that for an Hypercentral potential the expansion is limited to the secon degre polynomial and the shape of the two-body nuclear potential is not significant.

The basic equation are deduced from the statement that two states, wich are polynomilas, are independant when the integrales of their product over the while space is null.

The Planck constant appears nowhere in the equations.

Biography

Born on December 21, 1924 in Paris.

1943 – 1947 Graduate studies in Paris- the Sorbonne: General Mathematics, Differential and integral calculus, Rational mechanics, General physics, Radioactivity, Calculation of probabilities, Wave mechanics.

In 1947 joined the CNRS at the Radium Institute directed by Irène Joliot-Curie (Nobel Prize)

1956 Doctorate (Ph. D) under the responsibility of Louis de Broglie (Nobel Prize)

1961-1962 Invited to work for a year at Kyoto University (Japan)

1964-1968 Selected by the French Embassy to create a scientific service in Tokyo (Japan). Director of research at the CNRS

1969 Creation of the "Potential Harmonics" at the summer university of Predeal (Romania)

1970 Start of collaborations with many foreign universities.

Retired from the CNRS since 1989, I wrote 32 articles, some alone, others in collaboration, the last of which in November 2022 in the journal Few-Body Systems: Hyperspherical Quantum Mechanic.

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Electrospun nanofibers decorated with metallic nanoparticles for various applications

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Over the last few years, nanotechnology has appeared as one of the most widely used methods for the mitigation of water pollution problems. Particularly, nanoscale zerovalent iron (nZVI) emerged as one of the most broadly used methods in wastewater treatment and remediation due to its low-cost and high effectiveness. However, owing to its ease of aggregation and consequent loss of reactivity, nZVI is coupled with one or more transition metals to produce multimetallic systems. Two trimetallic nanoparticle systems were synthesized using sodium borohydride chemical reduction method. The materials were characterized and further tested for catalytic activity. Analytical techniques (i.e., EDX and XPS) showed the presence of all metals within multimetallic systems, viz. iron (Fe), copper (Cu), zinc (Zn) and silver (Ag). TEM images showed that the core-shell morphology of the nZVI-based nanoparticles was obtained. The evaluation of the catalytic activity of the nanoparticles was conducted using methyl orange (MO) dye as the model pollutant and the results showed a notable degradation efficiency within few minutes. Moreover, experiments were also conducted on the immobilization of the nanoparticles onto electrospun nanofibers. In this case, copper oxide nanoparticles were synthesized and incorporated into electrospun polyethersulfone/poly(vinyldene fluoride) (PES/PVDF) nanofibers for both antibacterial and dye degradation purposes. It was found that bare nanoparticles had better catalytic and antibacterial properties when compared to decorated nanofibers. This is as a result of polymeric materials covering active sites, and thus adversely affecting the overall performance.

Biography

Dr T.C. Mokhena is a Principal Research Scientist with PhD in Polymer Science obtained from the University of the Free State in 2017. He is a Director of Nanominerals Platform within Advanced Materials Division (AMD) at MINTEK. In this position, he oversees different industrial and academic related R&D projects as well as technical and scientific support to different industries, especially nanotechnology based industries. His research is centered around the use of waste materials to generate value-added products, such as biosensors, medical devices, wastewater treatment, costumed 3D printed devices etc. He has published more than 70 research outputs in the form of articles, and book chapters.

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Impact of Iron pyrite nanoparticles sizes in photovoltaic performance

R. Sai
Departement de Physique, Université de Carthage, Tunisia

With rising energy demand and depleted traditional fuels, solar cells offer a sustainable and clean option. In recent years, and due to its acceptable band gap, high absorption coefficient, and inexpensive cost, iron pyrite (FeS_2) is a popular material for solar cells. Earth abundance and nontoxicity further boost its photovoltaic possibilities. The current study examined the influence of sulfurization at 350–400° on iron pyrite layers fabricated using spray pyrolysis. The morphology and size from TEM confirmed the XRD results of synthesizing a pyrite FeS_2 with an average particle size of 10–23 nm at 350–400°, respectively. The direct band gap calculated by DFT as a function of temperature was found to be consistent with the experimental findings, 0.87 eV (0.87) and 0.90 eV (0.95) at 350° and 400°, respectively. We found high-performing photovoltaic cells on ITO/ZnO/ FeS_2/ MoO_3/Au/Ag, obtained with an excellent quality of nanoparticles and nanostructures of FeS_2 pyrite, which improved with the method of preparation and growth parameters.

Biography

Dr. Refka Sai has completed her Ph.D. (with Highest Honors) in Sciences and Technology (Major: Physics) from University of Carthage, Faculty of Sciences of Bizerte, Tunisia in December 2021. She has a good experience of research and has been a research fellow at leading instutions, Laboratoire de Physique du Solide au CNRS de Bellevue and laboratory of Semiconductors, Nanostructures and Advanced Technologies, Tunisia. She also served as visiting researcher at Department of Electronic Engineering University of Rome Torvergata Italy and Faculty of Sciences of Sciences of Tunis El Manar University Tunisia. Her research experiences manifested in over 10 research papers. Her area of expertise includes Condensed Matter Physics, Advanced Materials, Nano Science and Nanotechnology, Energy and Biosensor Field.

Activation energy tunability of electrical conduction mechanisms in ternary organic thin films

Laura Hrostea

Research Center on Advanced Materials and Technologies (RAMTECH), Department of Exact and Natural Sciences, Institute of Interdisciplinary Research, Alexandru Ioan Cuza University of Iasi

Ternary organic solar cells are based on an active layer consisting of the classical D/A matrix that incorporates, as a third element, a donor or an acceptor material. This approach gives the flexibility of choosing the most promising materials with complementary features, while the role of the third component is crucial, as it allows for various improvements, such as expanding the optical absorption spectra and supporting charge carrier transport. Therefore, this paper aims to emphasize the semiconductor behavior of binary and ternary blend thin films that are relevant for solar cell applications. The study is focused on three emerging photovoltaic materials (PBDB-T-2Cl, ITIC-F, PCBM), acting as electron donor or acceptors, deposited as thin films by spin coating on glass and ITO substrates. The electrical properties of the thin films were investigated, and it was observed that the addition of a third component in the D/A host matrix, in the case of ternary thin films, led to an enhanced electrical conductivity. However, this improvement should be considered in conjunction with the optical properties, aiming at a balance between electrical and optical performance. Overall, this study underscores the importance of semiconductor behavior in the investigated blend thin films and highlights the potential for tuning the activation energy by adjusting the weight ratio of the donor/acceptor materials in the composite materials.

Acknowledgement: This work was supported by a grant of the "Alexandru Ioan Cuza" University of Iasi, within the Research Grants program, Grant UAIC, code GI-UAIC-2021-07.

Biography

Laura Hrostea has completed her PhD in 2020 (at the age of 27 years) and she is a young researcher from Alexandru Ioan Cuza University of Iasi, RAMTECH Center. She is currently working on photovoltaic field research, being focused on preparation and characterization of organic thin film solar cell.

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September 14, 2023

KMC simulations of atomic redistribution in PCRAMs based on Ge-rich Ge-Sb-Te alloys

A. Portavoce[1], G. Roland[1,2], J. Remondina[1], M. Descoins[1], M. Bertoglio[1], Lorut[2] and M. Putero[1]

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Simulation of atomic redistribution in Ge-Sb-Te (GST)-based memory cells during SET/RESET cycling is needed in order to understand GST memory cell failure and to design improved non-volatile memories [1-2]. However, the exact simulation of this ternary system is difficult since Ge, Sb, and Te are of different nature and the amorphous-crystalline as well as the solid-liquid transitions of several binary and ternary phases need to be simulated.

In this work, a simplified GST system is proposed in order to catch the basics of atomic redistribution in Ge-rich GST memory cells using atomistic kinetic Monte Carlo (KMC) simulations based on the tight-biding Ising model and direct exchanges between first-neighbor lattice sites. Order-disorder transitions on a rigid fcc lattice are used to model amorphous-crystalline transitions at low temperature and solid-liquid transitions at high temperature. Simulations of Ge-rich GST film crystallization show good agreements with experiments according to crystallization kinetics and phase formation sequence versus Ge excess. Simulations of the cycling of a 50 nm-wide mushroom-type PCRAM cell show strong atomic redistribution, which suggests significant electrical property variations with cell ageing.

1. Lotnyk, A., Behrens, M., Rauschenbach, B. Phase change thin films for non-volatile memory applications. Nanoscale Adv. 1, 3836–3857 (2019).
2. Guo, P., Sarangan, A. M., Agha, I. *A review of germanium-antimony-telluride phase change materials for non-volatile memories and optical modulators.* Appl. Sci. 9, (2019).

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Is the cell a digitally controlled system?

Philip G. Penketh

Department of Pharmacology, Yale University School of Medicine, USA

The possible utilization of biological nano-logic circuits in the integration and regulation of DNA repair, and its potential use by cells in their rapid sub-second decision making are discussed. Given the advantages of logic type control, one would expect, that if it hadn't arisen initially during the abiotic phase of evolution, it would have arisen to control at least some biological processes during over the next ~ 3 billion years, where single celled life was likely the only form of life. Several of the required logic components have been identified in cells. Globular protein logic gates would be 10% of the size, in terms of their linear dimensions, as their smallest current electronic counterparts.

Electronic Gates

AND gate

Input A	Input B	Output
0	0	0
1	0	0
0	1	0
1	1	1

NAND gate

Input A	Input B	Output
0	0	1
1	0	1
0	1	1
1	1	0

OR gate

Input A	Input B	Output
0	0	0
1	0	1
0	1	1
1	1	1

NOR gate

Input A	Input B	Output
0	0	1
1	0	0
0	1	0
1	1	0

NOT gate (inverter)

Input	Output
0	1
1	0

Phosphologic Gates

AND gate

Input A	Input B	Output
0	0	-P
P	0	-P
0	P	-P
P	P	+P

NAND gate

Input A	Input B	Output
0	0	+P
P	0	+P
0	P	+P
P	P	-P

OR gate

Input A	Input B	Output
0	0	-P
P	0	+P
0	P	+P
P	P	+P

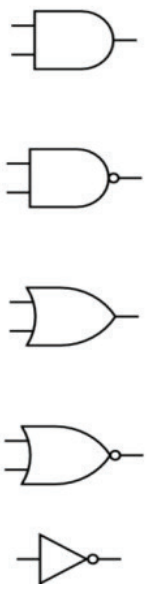
NOR gate

Input A	Input B	Output
0	0	+P
P	0	-P
0	P	-P
P	P	-P

NOT gate (inverter)

Input	Output
0	+P
P	-P

Gate Symbols



Biography

I completed my undergraduate studies in biochemistry at St. Catherine's College Oxford University and doctoral studies at Emmanuel College Cambridge, researching the mode of action of nitroheterocyclic drugs on trypanosomes at the Molteno Institute. Postdoctoral studies were completed at the Yale Laboratory of Epidemiology and Public Health and the Yale University Department of Pharmacology, where I worked as an Associate Research Scientist studying predominately the anticancer effects of alkylating agents until I retired in 2017. However, I have continued to publish research articles until 2022.

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September 14, 2023

Advanced polymeric nanocomposite membranes for water treatment

Abhispa Sahu[1] and **Jordan C. Poler**[2]

[1]*American Nano, LLC, USA*
[2]*Department of Chemistry, University of North Carolina, USA*

Water is essential for sustainable development, energy and food production, healthy ecosystems, and, of course, all life. However, population growth, industrialization, and socio-economic growth have led to anthropomorphic climate change and pollution, and thereby the deterioration of water quality, especially in developing countries. Current water treatment plants are not effective at the removal of pervasive, hydrophilic, low molecular weight contaminants, which can adversely affect human health. Herein, we have developed a novel strategy for functionalizing fluorographite nanoplatelets with quaternary ammonium polyelectrolyte resin brushes under mild conditions in water. Since fluorographite is superhydrophobic, we demonstrate the necessity of reactive polymer radical chain end to initiate defluorination and exfoliation resulting in subsequent functionalization on fluorographite surface in water at neutral pH without the need of hazardous chemicals. These functionalized platelets were deposited as thin films and scanning electron microscopy demonstrated continuous and organized stacking of nanoplatelets with defect free regions. A radical initiation mechanism was proposed for the defluorination and oxidation of fluorographite. Selective area electron diffraction demonstrates the transition of diffusive rings of fluorographite to a highly ordered crystalline phase in functionalized fluorographite. Electron microscopy, vibrational spectroscopy, elemental analysis, and thermal analysis

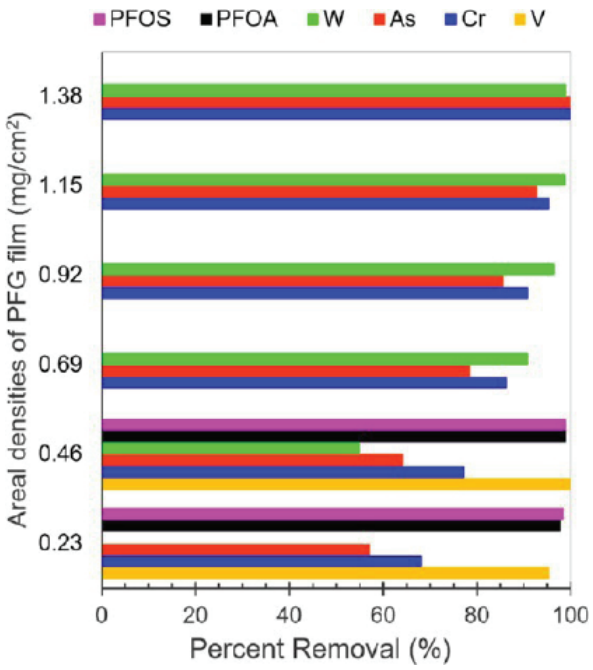

Figure showing percent removal of emerging contaminants using nanocomposite membrane

data will be presented. These membranes demonstrated 99% removal of emerging contaminant like perfluorooctanoic acid to below 100 parts per trillion with a permeation flux as high as 1100 L h-1 m-2 bar-1. In this study, we have illustrated that highly functionalized fluorographite thin films are compelling models for next generation high-capacity removal of contaminants of emerging concern and other sustainable technology applications.

Biography

Dr. Abhispa Sahu is a senior research scientist working in the field of polymers and materials science at American Nano, LLC, a startup company based in North Carolina, US. She has published 6 first author scholarly articles in high impact factor journals with international circulation, focusing on polymer nanocomposites for water treatment and drug delivery. She graduated with a Ph.D. in Nanoscale Science from the University of North Carolina at Charlotte, US in 2020. She is an active peer reviewer for 8 distinguished journals including Nanoscale, Nanoscale Advances, Environmental Science: Water Research and Technology, Ultrasonics Sonochemistry, Soft Matter, RSC Advances, Journal of Physics D: Applied Physics and Physics Scripta with over 56 peer reviews to date. She was recognized as one of the outstanding peer reviewers for 2022 by RSC Advances. She owns a pending international patent and three US based patents. She was the team lead on a proposal that won around $25,000 in the U.S. Environmental Protection Agency funded 16th P3 Annual Phase 1: A National Student Design Competition.

RAI – Responsible artificial intelligence, a short analysis

Fernando Buarque de Lima Neto

University of Pernambuco, Brazil

Current advances in Machine Learning and Artificial Intelligence are many and often surprising. So far, these advances have mostly focused on qualitative results (for example, creating metaheuristic algorithms that can solve complex engineering problems), which generally leave users well served. However, it is troublesome the facts that most algorithms produced and used are (1) oblivious to what they actually are accomplishing and (2) have few social and moral references. In the talk a more reasonable, responsible and conscious type of AI will be presented and commented upon. In addition, the importance and implications of these innovations to Engineering will be discussed with the audience.

Biography

Prof. Buarque is PhD in Artificial Intelligence (Imperial College London-2002), Associate Professor and research leader in AI at the University of Pernambuco-Brazil, has supervised more than 120 students and authored of 6 books, and more than 240 scientific publications. His current research addresses complex decision problems, through rational/explainable evolutionary and social processes. He thinks that Responsible AI can lead to prosperous and happy societies.

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When bacteria meet nanomaterials: nanosensors for the detection of microbial pathogens

Leslie Susana Arcila-Lozano[1,2] and
Luis Ramiro Caso-Vargas[3]

[1]*Consejo Nacional de Humanidades, Ciencia y Tecnología, Ciudad de México, México*
[2]*Instituto Politécnico Nacional, Centro de Investigación en Biotecnología Aplicada, México*
[3]*Benemérita Universidad Autónoma de Puebla, Facultad de Ciencias Biológicas, México*

Multidrug-resistant microorganisms are a serious public health problem. WHO published a global list of antibiotic resistant bacteria, ESKAPE bacteria occupy the top positions and within this group Pseudomona aeruginosa is ranked as a critical priority for research and diagnostic developments to minimize morbidity and mortality from this infectious bacterial agent. Biosensors offer several advantages over existing techniques including reduced analysis time, improved sensitivity, and real-time analysis. Gold nanoparticles (AuNPs) are widely used in the development of biosensors as they possess unique characteristics and properties such as high dispersion in water, easily tailored synthesis for suitable morphology, size control and high affinity for ligands such as thiols and amines allowing bioconjugation with biological molecules such as proteins. The aim of this work is the development of a nanosensor based on gold nanoparticles for the identification of Pseudomona aeruginosa using FT-IR spectroscopy. The methodology employed in this work related to the assembly and characterization of the nanosensor is based on that reported by Arcila-Lozano L.S., et al., 2017. The biosensor is constituted by a transducer element which are the AuNPs, these were conjugated with the streptavidin protein coating its surface to stabilize the colloidal system and at the same time be a binding bridge with the biotinylated antibody. Figure 1 shows the FTIR spectra of the AuNPs, the streptavidin protein and the conjugate, the latter being the first stage of the biosensor assembly. The absorption band present at 1595 cm-1 arises from the adsorption of streptavidin with the AuNPs indicating that the N-H residues are directly involved in the interaction with the AuNPs. Figure 2 shows the characteristic absorption bands of Gram-negative bacteria, showing the spectral assignments corresponding to the functional groups of the main cell wall constituents which are carbohydrates, lipids and proteins. The assembly conditions of the biosensor were standardized by characterizing its constituent elements. The nanobiosensor will allow the identification of the analyte of interest by FTIR spectral analysis, contributing to the diagnosis of this multidrug-resistant pathogenic bacterium.

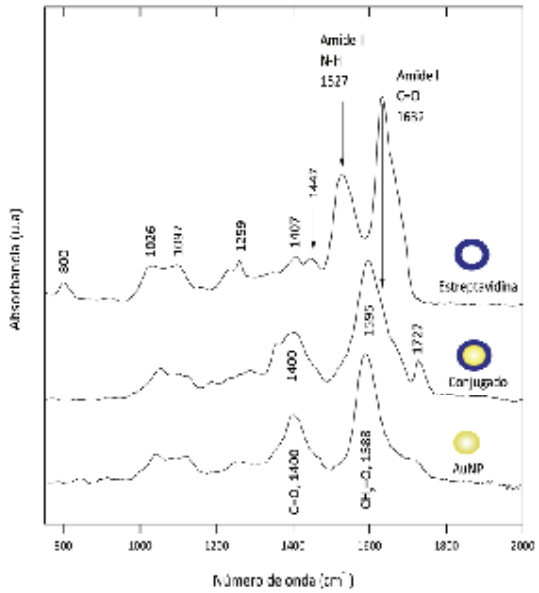

Figure 1. *FTIR spectra of gold nanoparticles, protein-streptavidin and conjugate.*

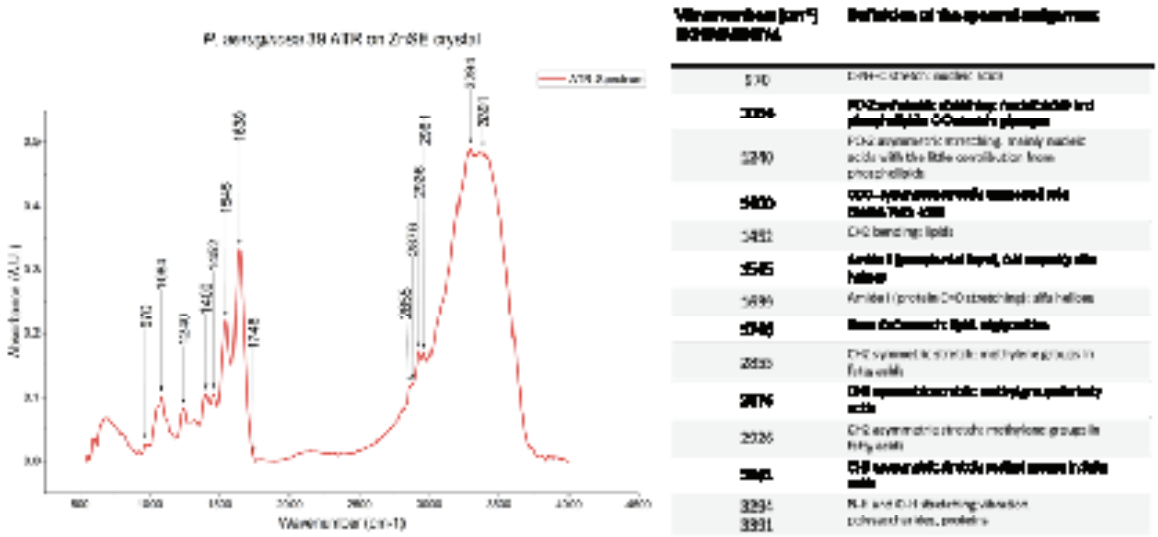

Fig. 2. *FTIR spectrum of the bacterium Pseudomona aeruginosa.*

Biography

Dra. Leslie S. Arcila-Lozano studied a degree in Pharmaceutical Chemistry and Biology at Universidad Veracruzana; Master degree in Microbiological Sciences at the Benemérita Universidad Autónoma de Puebla; PhD in Biotechnology Sciences, National Polytechnic Institute. She is currently part of the Researcher Program for México CONAHCYT commissioned to the Center for Research in Applied Biotechnology of the National Polytechnic Institute. The main research line is to develop optical biosensing systems based on nanomaterials with application in health, food, and water for the detection of pathogenic microorganisms, as well as to evaluate the biological properties of nanomaterials. Her research interests are general microbiology, applied microbiology, food microbiology, food safety, bacteriology, biology, biotechnology and bio-nanotechnology.

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ACCEPTED ABSTRACTS

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NANO INTELLECTS 2023

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A feasible residual error-Based density peak clustering algorithm with the fragment merging strategy

Milan D. Parmar[1,2,4], Wei Pang[3], Dehao Hao[4], Jinahua Jiang[4], Wang Liupu[2], Limin Wang[4] and **You Zhou[2]**

[1]Department of Computing Science and Engineering, Mississippi State University, USA
[2]Key Laboratory of Symbolic Computation and Knowledge Engineering, Jilin University, China
[3]Department of Computing Science, University of Aberdeen, U.K
[4]School of Management Science and Information Engineering, Jilin University of Finance and Economics, China

The most common issues for many clustering algorithms include slow convergence, the requirement for pre-specification of a number of parameters, and the lack of robustness when dealing with anomalies. Recently, the density peak clustering (DPC) algorithm was proposed to discover the centers of clusters by finding the density peaks in a dataset based on their local densities. The DPC needs neither an iterative process nor a large number of parameters, and it supports a heuristic approach, known as the decision graph, to manually select cluster centroids. However, the selection of the key parameters of the DPC was not systematically investigated. In this study, we propose the feasible residual error-based density peak clustering algorithm with the fragment merging strategy, where the local density within the neighborhood region is measured through the residual error computation, and the resulting residual errors are then used to generate residual fragments for cluster formation. The model parameters are then able to be calculated from the equations with statistical theoretical justification. We also develop a semi-automatic cluster identification method to eliminate the iterative process of manual centroid selection. The robustness and effectiveness of the proposed algorithm compared to the DPC, and other clustering algorithms are demonstrated through experiments on standard benchmark datasets. The proposed method named feasible residual error-based density peak clustering (FREDPC) algorithm with the fragment merging strategy only needs to perform in one single step without any iteration and thus it is fast and has a great potential to be applied to a wide range of applications such as image and facial expression datasets.

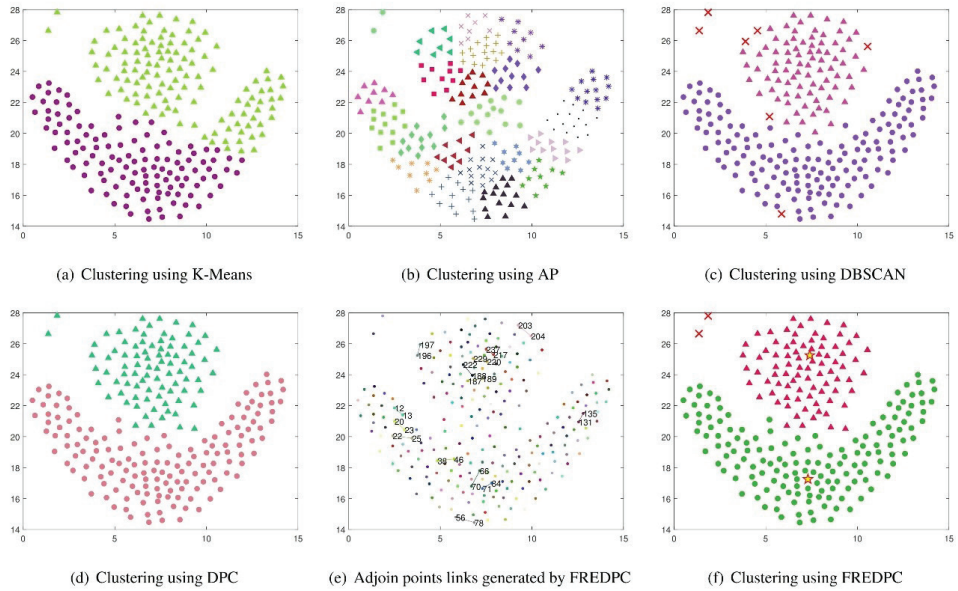

Figure 1: *Clustering results on the Flame dataset.*

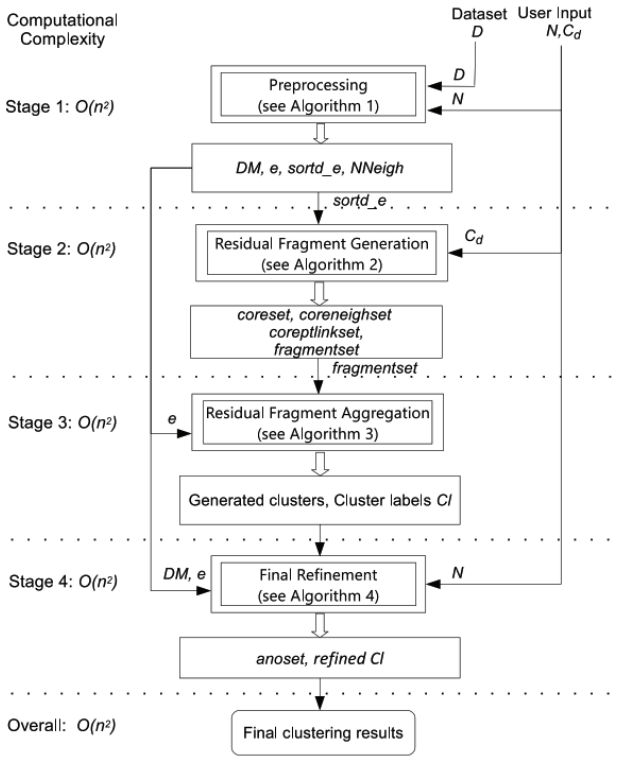

Figure 2: *The workflow of the overall FREDPC algorithm.*

Algorithm:	K-Means	AP	DBSCAN	DPC	FREDPC
Complexity:	$O(IKn)$	$O(In^2)$	$O(n \log n)$	$O(n^2)$	$O(n^2)$

Table 1: *Computational Complexity Comparisons*

Datasets	Clustering Algorithms				
	K-Means	AP	DBSCAN	DPC	FREDPC
Iris	0.8149	0.3924	0.7462	0.8404	**0.9234**
Thyroid	0.7251	0.1814	0.6264	0.7545	**0.7760**
Liver	0.6237	0.0748	0.6264	0.6460	**0.6661**
Ecoli	0.5192	0.2191	0.4253	0.6404	**0.8104**
Pima	0.6001	0.0412	0.6700	0.6874	**0.7045**
Breast	0.6100	0.0569	0.6606	0.6625	**0.7316**
Glass	0.4936	0.2355	0.4213	0.4641	**0.5183**
Wine	0.5896	0.2521	0.5052	0.5699	**0.6560**
Vehicle	0.3168	0.0669	0.3606	0.3728	**0.4058**
German	0.6577	0.0377	0.7104	0.7214	**0.7333**
Ionosphere	0.6004	0.1882	0.6188	0.6252	**0.6999**
Sonar	0.5032	0.0995	0.5443	0.5600	**0.5988**
Flame	0.7432	0.1538	0.8873	**1.0000**	**1.0000**
Aggregation	0.7890	0.2117	0.8885	**1.0000**	0.9880
Spiral	0.3278	0.1505	**1.0000**	**1.0000**	**1.0000**
R15	0.8765	0.9018	0.9398	0.9867	**0.9900**
Twenty	0.9202	0.7496	**1.0000**	**1.0000**	**1.0000**
D1	0.8352	0.5445	**1.0000**	**1.0000**	**1.0000**
D2	0.9976	0.9332	0.9332	0.9756	**1.0000**

Table 2: *Performance Comparison*

Biography

Milan Parmar is an academician, consultant, and researcher with a demonstrated history of working in higher education and industry and an excellent research publication record with 8+ years of extensive research experience and credentials in Data Science. He is currently working as a researcher in the Computer Science Engineering department at Mississippi State University in Starkville, Mississippi, USA. He is currently assisting the Dean of the Department in maintaining a Predictive Analytics & Technology Integration (PATENT) Lab. His major responsibilities include teaching related courses, supervising Ph.D. and master's students on their theses, and identifying new analysis topics for the group that could lead to publications. He is the first Indian to receive the Chinese Education Board's Outstanding Foreign Lecturer Award in Jilin Province, China. He received his Ph.D. in computer applied and technology from Jilin University, China, in 2019, his Master's in Embedded Microelectronics and Wireless Systems from Coventry University in the U.K., in 2012, and his bachelor's degree in Electronics and Communication Engineering from Mumbai University in India. His research interests include pattern recognition, machine learning, data analysis, and evolutionary computation.

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September 14, 2023

Overcoming the valley of death: A new model for high technology startups

A. Gbadegeshin Saheed[1,2], Al Natsheh, K. Ghafel, O. Mohammed, A. Koskela, A. Rimpiläinen, J. Tikkanen and **A.I. Kuoppala**

[1]Arden University, United Kingdom

[2]DeGesh Institute of Technology and Entrepreneurship, Finland

The Valley of Death (VoD) reflects a series of challenges facing technology-based companies during their early development stages. Extant literature highlights the need for startups to equip themselves with the tools and resources to manage this turbulent transition. However, the existing frameworks propounded by fellow scholars and practitioners regarding VoD are fragmented, each covering only a few issues in the chasm. Thus, the current article proposes a new and comprehensive model for high technology-based startups. The new model emerged from an in-depth review of 128 scholarly materials and empirical data collected from 30 startups (from artificial intelligence, virtual and augmented realities, internet of things, medical, and cleantech industrial sectors). The model was piloted in three pre-startups. The model adds on the existing VoD frameworks to provide a holistic baseline for future research in this field by presenting different challenges underlying the pre-establishment years of a company while addressing courses of action needed to overcome this perilous transition.

Biography

Dr Saheed Adebayo Gbadegeshin is a technology commercialization expert, entrepreneur, entrepreneurship educator, and new business development and family business continuity consultant. Presently, he is working at Arden University, London, United Kingdom. He is the Chairman of the Board of Directors of DeGesh Group (UK) Limited. He is also lecturer at Global Banking School (UK) and a Senior Research Fellow at the Centre for Multidisciplinary Research and Innovation (CEMRI), Finland. He is a Full Member of the Association for Project Management (UK), a Fellow Member of the Institute of Administrative and Management (UK), a Full Member of the International Institute of Business Analysis (UK) and Member of the Chartered Management Institute (UK). He obtained his doctorate degree in entrepreneurship from the University of Turku (Finland).

"What is nano thought?"

Natasha Lushetich
University of Dundee, UK

Technology is a host of social and material techniques, tools, and methods. Today, this vast field can be divided into three subfields:

1.Digital Technology, which ranges from blockchain and diagnostic medical technologies to cognitive augmentation technologies;

2. Spatial, Temporal, Aural and Visual Technologies, which include technologies for building spatial structures and manufacturing instruments; and

3. Epistemic Technologies, which include techniques of knowing, from scientific protocols to probabilistic scenario modelling.

The first two subfields have expanded exponentially in the last few decades with the aid of nanoelectronics, nanophotonics, and nanoionics. The third subfield, however, – Epistemic Technologies – has remained under-researched. Contrary to received ideas about nanotechnologies as delicate tools that perform the exploratory, diagnostic and, in some cases, decision-making work on behalf of humans, this talk asks: what kind of thinking do humans need to develop to keep abreast of the accelerated nanotechnological progress of the last few decades? Thinking here includes not only observation and decoding techniques but also micro- or, better said, nano-temporal problem-solving, forecasting, predictive analysis, and, most importantly: imaginative nano-temporal scenario modelling.

Biography

Natasha Lushetich is Professor of Contemporary Art, Media & Theory at the University of Dundee and the UK Arts and Humanities Research Leadership Fellow. She is the recipient of numerous fellowships such as Fulbright, Steim and ArtsLink. Her books include: Fluxus: The Practice of Non-Duality (2014), Interdisciplinary Performance (2016), The Aesthetics of Necropolitics (2018), Beyond Mind, a special issue of Symbolism (2019), Distributed Perception, co-edited with I. Campbell (2022) and Contingency and Plasticity in Everyday Technologies, co-edited with I. Campbell and D. Smith (2022).

Transforming social media networks and contact centres: The power of natural language processing applications

Shereen Fouad
School of Computer Science and Digital Technologies, Aston University, UK

Natural Language Processing (NLP) is a subfield of artificial intelligence that focuses on the interaction between humans and digital platforms through natural language. In recent years, NLP has gained significant attention and revolutionized various industries, including social media networks and contact centres (CCs) automations. In this talk, I will share some insights, using some of my previous work, on the key applications, challenges, and impact of NLP in these two important domains.

CCs have been highly valued by organizations for a long time. The COVID-19 pandemic has underscored the significance of CCs in ensuring business continuity and quality customer support. Organizations face an increased volume of customer inquiries related to various concerns, prompting them to re-evaluate CC functions. Next-generation platforms incorporating machine learning and NLP, like self-service voice portals and chatbots, are being adopted to improve customer service. In this talk I will highlight some of the advantages and challenges of transitioning to a CC that utilizes NLP solutions.

Many people have used social media platforms to express their emotions and thoughts about important topics and event. NLP plays a crucial role in enhancing user experience and content moderation. Sentiment analysis is a NLP technique that determines the emotions and attitudes expressed in social media posts, classifying it as positive, negative, or neutral. This technique helps to detect the public's attitude towards important political and public topics. The talk will also highlight example sentiment analysis applications and techniques that have been widely used to gauge public sentiment about important topics.

Biography

Dr Fouad is a lecturer at the College of Engineering and Physical Sciences, Aston University, UK. She is also an Honorary Research Fellow at the Institute of Clinical Sciences at the University of Birmingham, UK. Dr Fouad received her PhD degree in Machine Learning from the School of Computer Science, The University of Birmingham, UK (2013). She has worked on various enterprise and research projects including as CI in ESRC project, project leader/academic supervisor of two Knowledge Transfer Partnership projects (Innovate UK), and as PI of an Innovate UK/APC funded project. Her research interests include Data Analytics, Machine Learning and their applications in Medical Imaging, Business and Cyber Security.

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Nonlocal complement value problem for a global in time parabolic equation

Guy Foghem[2], Jean-Daniel Djida[1] and **Yannick Kouakep[3]**
[1]*University of Erlangen, Germany*
[2]*TU Dresden, Germany*
[3]*University of N'Gaoundéré, Cameroon*

We investigate the existence and uniqueness of weak solution of a semilinear parabolic equation with double nonlocality in space and in time variables that naturally arises while modeling a biological nanosensor in the chaotic dynamics of a polymer chain. The equation of interest in our model is given by

$$\begin{cases} \partial_t u + \mathbf{L}u + \varphi\left(\int_0^T u(\cdot,\tau)\,d\tau\right) u = 0 & \text{in } \Omega_T := \Omega \times (0,T), \\ u = 0 & \text{in } \Sigma := (\mathbb{R}^N \setminus \Omega) \times (0,T), \\ u(\cdot,0) = u_0 & \text{in } \Omega. \end{cases}$$

In fact, the problem under consideration involves a symmetric integrodifferential operator of Lévy type L and a term called the interaction potential, that depends on the time-integral of the solution over the entire interval of solving the problem. A prototypical example of operator symmetric integrodifferential operator of Lévy includes the well-known Laplace operator of fractional order $L = (-\Delta)^s$, $s \in (0,1)$. Using to the Galerkin approximation, the existence and uniqueness of a weak solution of the nonlocal complement value problem is proven for small time under fair conditions on the interaction potential. Int turns out that the solution in the local setting, i.e., is the Laplace operator, can be viewed as limits of nonlocal solutions, e.g., when $L = (-\Delta)^s$.

Biography

I am currently Postdoc at TU Dresden in Germany since October 2020. Prior to that, I obtained my PhD at Bielefeld University in September 2020, which started in October 2016. My main area of research focuses on the study of nonlocal operators and related applications to the model problem driven by nonlocal IntegroDifferential Equations (IDEs). I am also interested in binding the IDEs theory and the theory of PDEs, viz., in the study of the asymptotic of nonlocal objects whose limits turn to local objects.

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Design of novel type-I (Type-II) band alignment in GeC-VXY (V=Cl, Br; Y=Se, Te) van der Waals heterostructure for optoelectronic and renewable energy application

M. Idrees[1], B. Amin[1,2], Yuanping Chen[1] and **Xiaohong Yan[1]**
[1]School of Physics and Electronic Engineering, Jiangsu University, China
[2]Department of Physics, Abbottabad University of Science & Technology, Pakistan

Van der Waals heterostructure (vdWH) of two dimensional (2D) materials exhibit abundant physical properties as well as important applications in nanoelectronics, optoelectronics, photocatalysis and renewable energy. Here, we investigate optoelectronic and photocatalytic properties of vdWH GeC-VXY (X=Cl, Br; Y=Se, Te) by performing density functional calculations. Different staking models and stabilities of the vdWH are compared. Our calculated results confirms that GeC-VClSe (GeC-VBrSe) vdWH for model-I and II have direct type-II band alignment, playing crucial rule in light harvesting and detection; while the remaining vdWH have indirect band gaps with type-I band alignment. Optical properties in term of imaginary part of dielectric function have also been calculated, which show that all the first exitonic peaks lies in the visible region and also blue shifts are observed in vdWH. In the last we have calculated the photocatalytic properties of GeC-VXY (X=Cl, Br; Y=Se, Te) vdWH and found to be a potential photocatalytic for full water splitting at pH=0.

Mechanism of porous $Se@SiO_2$ nanospheres inducing cuproptosis in CRPC

Boyu Yang
Department of Urology, Capital Medical University Affiliated Beijing Friendship Hospital, China

Though selenium nano-particles are reported to inhibit tumor growth, the mechanisms are still not clear. Based on our previous work, porous selenium nanocomposites ($Se@SiO_2$) with high biosafety and tumor-targeting properties were synthesized. $Se@SiO_2$ could reduce proliferation and autophagy level in CRPC cells. Furthermore, our results showed that $Se@SiO_2$ could enhance the protein stability of intracellular prostate acid phosphatase (cPAP). As a tyrosine phosphatase, cPAP blocks the initiation of autophagy by promoting ATG14 dephosphorylation, thereby reducing the proliferation of CRPC cells. In addition, three possible tyrosine phosphorylation sites (Y279/Y357/Y488) were identified using site-directed mutagenesis. Accordingly, we hypothesized that $Se@SiO_2$ can inhibit autophagy by activating cPAP-ATG14 signaling axis in CRPC treatment. This study will elucidate the molecular mechanism of $Se@SiO_2$ regulating autophagy through cPAP. Our research provides a new therapeutic option and theoretical evidence for the treatment of CRPC.

Biography

Bo-Yu Yang have been engaged in basic and clinical research related to prostate diseases, especially have a deeper understanding of the molecular mechanism and application of medical nanomaterials in prostate diseases. At present, I am in charge of a project of the National Natural Science Foundation, which has been selected into the 2020 (sixth batch) "Green Seedling" program and friendship seed Program. He won the award for Best Young Editor of the second edition of Guo Yinglu Male Science. Obtained one invention patent and four utility model patents as the first inventor. I have the advantages of reviewing and soliciting manuscripts in the field of medical engineering.

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Predicting continuity of asthma care using a machine learning model: Retrospective cohort study

Yao Tong
School of Artificial Intelligence and Information Technology, China

Continuity of care (COC) has been shown to possess numerous health benefits for chronic diseases. Specifically, the establishment of its level can facilitate clinical decision-making and enhanced allocation of healthcare resources. However, the use of a generalizable predictive methodology to determine the COC in patients has been underinvestigated. To fill this research gap, this study aimed to develop a machine learning model to predict the future COC of asthma patients and explore the associated factors. We included 31,724 adult outpatients with asthma who received care from the University of Washington Medicine between 2011 and 2018, and examined 138 features to build the machine learning model. Following the 10-fold cross-validations, the proposed model yielded an accuracy of 88.20%, an average area under the receiver operating characteristic curve of 0.96, and an average F1 score of 0.86. Further analysis revealed that the severity of asthma, comorbidities, insurance, and age were highly correlated with the COC of patients with asthma. This study used predictive methods to obtain the COC of patients and our excellent modeling strategy achieved high performance. After further optimization, the model could facilitate future clinical decisions, hospital management, and improve outcomes.

Table 1. *Prediction performance of various machine learning models*

Model	Accuracy	Precision	Recall	F1 score	AUROC
Baseline	57.94%	-	-	-	-
C4.5	87.37%	0.84	0.87	0.85	0.90
k-NN	59.62%	0.60	0.60	0.60	0.63
Naive Bayes	46.04%	0.71	0.46	0.38	0.88
SVM	84.90%	0.81	0.85	0.82	0.87
Random forest	87.87%	0.86	0.87	0.85	0.94
XGBoost	88.20%	0.85	0.88	0.86	0.96

Biography

YAO TONG received the B.S. degree in electronic information engineering and the M.S. degree in software engineering from Hohai University, Nanjing, Jiangsu, China, in 2015 and 2017, respectively, and the Ph.D. degree in software engineering from Zhengzhou University, Zhengzhou, Henan, China. From 2019 to 2021, she was a Visiting Ph.D. Student in the Department of Biomedical Informatics and Medical Education, University of Washington, Seattle, WA, USA. She is currently an Assistant Professor with the School of Artificial Intelligence and Information Technology, Nanjing University of Chinese Medicine, Nanjing, Jiangsu, China. Her research interests include machine learning, database systems, and clinical informatics.

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Gradient structure of Ti-55531 with nano-ultrafine grains fabricated by simulation and suction casting

Yabo Fu[1,2], Qingfa Pan[1], Gang Liu[1,2] and **Guangliang Zhang[1,2]**
[1]*Zhejiang Provincial Key Laboratory for Cutting Tools, Taizhou University, China*
[2]*School of Materials Science and Engineering, Taizhou University, China*

Optimizing the casting parameters of Ti-55531 is crucial in large aircraft castings. The thermodynamics parameters were simulated using the ProCAST software, and the properties of a gradient structure alloy with ultrafine microstructure were studied. The results indicate that the gradient structure of Ti-55531 with ultrafine grains is obtained. From the edge to the center, the gradient cooling rate decreases gradually from 88.83°C/s to 52.79°C/s and then to 37.51°C/s as shown by the simulated parameters, resulting in the rapid solidification of the edge area to form the ultrafine grains. The hardness tends to strengthen with increasing radius in a gradient, from 3.67 ± 0.12 GPa at the center, gradually increasing to 3.79 ± 0.07 GPa at radius R1500, and finally reaching a maximum of 4.12 ± 0.33 GPa due to the nano-ultrafine grains at radius R3000. A gradient structure can increase the strength-ductility of the Ti-55531 alloy. The compressive strength and strain are 3118 MPa and 69%, which are 36% and 30% higher compared to the non- gradient alloy. A new equation of calculated melting temperature is obtained as . This study provides a new method for preparing gradient structures.

Nitrogen-doped carbon dots modified sodium alginate hydrogel film with excellent antioxidant and antimicrobial properties

Hui Wang, Pengyuan Sun, Meihui Wang, Xiufang Xia, Qian Liu and **Baohua Kong**

College of Food Science, Northeast Agricultural University, China

Carbon dots (CDs) as a class of fluorescent nanomaterials with a size smaller than 10 nm have received great attention due to their outstanding biocompatibility, water solubility, low toxicity, antioxidant and antibacterial activity. In this study, nitrogen-doped carbon dots (N-CDs) from citric acid were synthesized by micro-blog assisted method and incorporated in sodium alginate (NaAlg) film to form N-CDs modified NaAlg composite hydrogel films (NaAlg/N-CDs). In the system, $CaCO_3$ was used as crosslinking agent, and the N-CDs provided acidic environment to help to form Ca^{2+} crosslinked NaAlg hydorgel film with uniform morphology. What's more, it is interested to mention that the addition of N-CDs offers excellent antimicrobial and antioxidant properties for the neat NaAlg hydrogel film. The antioxidant activity of NaAlg/N-CDs hydrogel films with 5%, 7.5%, 15% and 30% N-CDs were determined. As shown in Figure 1, the DPPH and ABTS radical scavenging rates of the NaAlg/N-CDs hydrogel film with 30% N-CDs are as high as 77% and 98%, respectively. At the same time, the total number of colonies results represent that the inhibition rate of the NaAlg/N-CDs hydrogel film against Staphylococcus aureus and Escherichia coli is significantly increased after the addition of N-CDs as represented in Figure 2, respectively. The prepared NaAlg/N-CDs hydrogel film would be a potential functional materials in biology, medicine, and food industry.

Biography

Dr. Hui Wang, College of Food Science, Northeast Agricultural University, who is concentrated in the research on meat and meat products processing, micro- and nano-molecular self-assembly and delivery, food packaging and preservation. She has been awarded the honorary of 'Young Scientific and Technological Innovative Talents in Heilongjiang Province' and 'Young Talents in Northeast Agricultural University'. She has presided over 5 scientific research projects in recent 3 years, including Heilongjiang Province 'Baiwan' Project, Heilongjiang Province Natural Science Foundation, Heilongjiang Province postdoctoral research projects, etc. She has been published several papers in food and material science area, such as Food Chemistry, LWT-Food Science and Technology, International Journal of Biological Macromolecules, Thermochimica, etc.

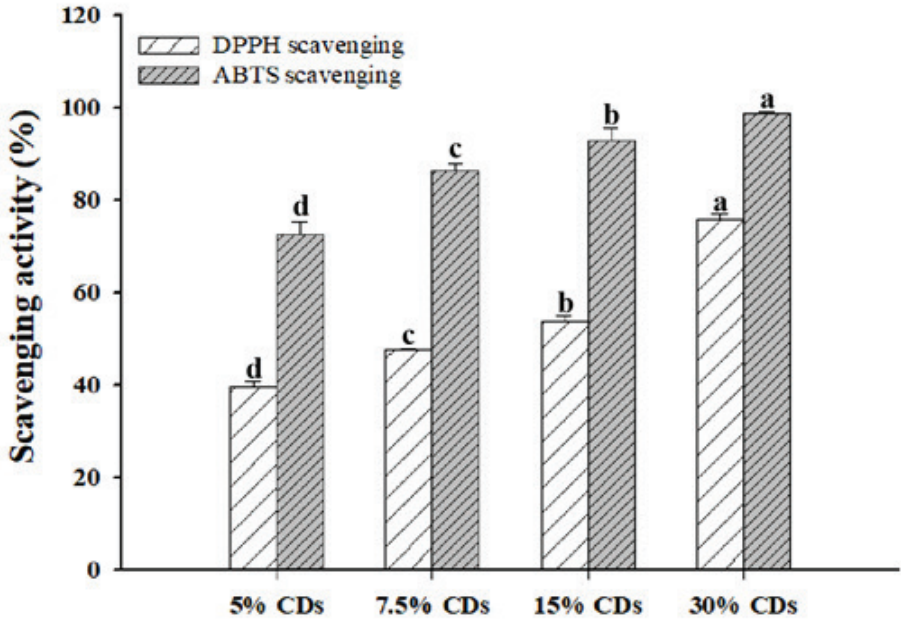

Figure 1. *DPPH radical and ABTS radical cation scavenging activity of Sodium alginate hydrogel film*

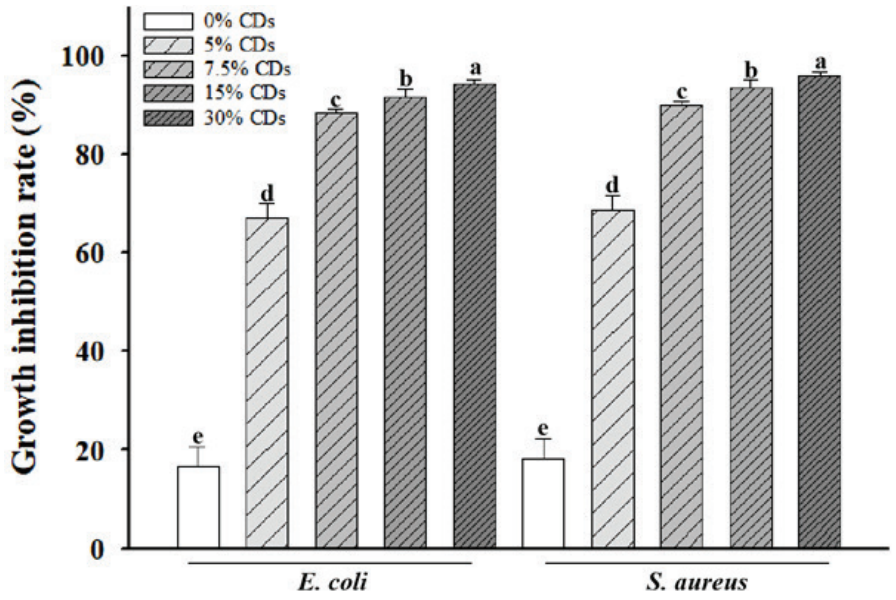

Figure 2. *Growth inhibition rate of nitrogen doped carbon water gel film on Escherichia coli and Staphylococcus aureus*

Federated learning security and privacy-preserving algorithm and experiments research under IoT critical infrastructure

Nasir Ahmad Jalali and **Chen Hongsong**

University of Science and Technology Beijing, China

The recent wide usage of the Internet of Things (IoT) and Artificial Intelligence development enabled applications to cross a commercial and industry band setting. All participants related to commercial and industrial systems need to communicate and generate data. Due to the small storage capacity of IoT devices, they need to store and transfer the generated data to a third party or organization commonly called the cloud which creates one single point to store their data. However, as the number of participants increases the size of generated data will be growing too. Therefore such a centralized mechanism for data collection and exchange between participants will be faced many challenges such as security, privacy, and performance. To address these challenges Federated Learning (FL) is a reasonable solution by a decentralizing approach that clients do not need to transfer and store real data in the central server. So clients can only share updated training model which is trained over their private datasets. On the other hand, Federated learning is a technique that enables clients in distributed systems to share their machine-learning model collaboratively without their training data, hence federated learning will reduce data privacy and security challenges. But slow model training and the execution of additional unnecessary communication rounds will hinder federated learning applications to operate properly in a distributed system, in addition, these unnecessary communication rounds will make the system vulnerable to security and privacy because irrelevant model updates are sent between clients and servers. In this work, we propose algorithms for full homomorphic encryption schema by the name of Cheon-Kim-Kim-Song (CKKS) to encrypt model parameters for their local information privacy-preserving, which uses the Impetus term to speed up model convergence during the model training process. Another essential point is establishing a secure communication channel between IoT devices and server, so for this, we use lightweight secure transport protocol to mitigate the communication overhead that helps to improve communication security and efficiency with low communication latency between client and server.

Biography

He has been a Ph.D. student at the University of Science and Technology Beijing (USTB), China since 2020. Mr. Jalali received his Master's Degree in Computer Science (Information Technology) from Kabul University and cooperated with Tallinn University, Estonia in 2016. He has been an associate professor at Ghazni University, Afghanistan since 2012. His research area is network security, information security, wired and wireless network, machine learning, and big data. Mr. Jalali has published four academic papers and two books entitled MPLS-VPN Impacts on VoIP-QoS and Framework Development for Higher Education Information Security in Afghanistan respectively.

Metal-induced polymeric aggregates (MIPAs) for photon quantum energy conversion

J. G. Tang, M. L. Li and **S. J. Chen**

National Center of International Joint Research for Hybrid Materials Technology, Qingdao University, China

This research has targeted to dissolve dispersion problem of lanthanide ions in polymer host, thus, we innovated the metal-induced polymer aggregates □MIPA□ strategy to generate the compatibility among the positively charged metal ions and polymeric host, functional surface of the aggregates, and the embedment of metal ions with excellent photon and electron quantum properties. With this strategy, organic lanthanide complexes (OLC) can disperse into inside or anchor at the surface of inorganic or diblock copolymeric nanoparticles. Therefore, we successfully convert the dispersion of lanthanide ions in polymer host. Through the investigations on host materials of diblock copolymers, SiO2 nanoparticles, natural biological macromolecules (proteins and polyelectrolytes), as well as the typical inorganic substrate materials, we successfully obtained series of luminescent materials, luminesce nanomaterials for hybrid polymer solar cells, light-emitting fiber materials, luminescent thin film materials, etc. We will present 6 representative important achievements, including: (1) the lanthanide ion-induced polymeric aggregates with highly luminous performance, (2) the Plasman effect of nanometals enhances luminous intensity of fluorescent dyes, (3) hybrid polymer solar cells, including: block copolymer-Ln3+ solid nano-micelles-doped polymer solar cells, up-conversion polymer solar cells, nanometal doped polymer solar cells, (4) protein luminous crystals, (5) polyelectrolyte luminescence materials, (6) hybrid polymer luminescent fibers.

Biography

Professor Dr. Jianguo Tang, is a hybrid Materials Scientist, the Fellow of Royal Society of Chemistry, Ph. D. Supervisor, Director of National Center of International Joint Researches for Hybrid Materials Technology. In April 2000, he received his Ph. D. degree of materials science at Shanghai Jiao Tong University. From 2000 to 2001, he was a visiting professor in Germany for one year. From 2001 to 2003, he was a postdoctoral fellow at Colorado State University (USA). His research focuses on pioneering completely new field of polymeric hybrids with wide heterogeneous nano-species for new photonic quantum properties and technologies. He created the metal ion-induced polymeric nano-aggregation (MIPAs), based on the coordination interactions between polymeric chains and metal ions; and he generated polymeric solid solution concept of heterogeneous species (PSSC), for the uniquely embedment of metal ions, inorganic quantum dots, and nanocarbons in polymer host without new phases formation. He published 296 SCI-cited papers and authorized 84 innovation patents including 1 US and 1 European ones.

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Selection of emission wavelength of lasing via a hybrid microcavity

Hong Yang[1], Hailang Dai[1], Qiheng Wei[1], Hongrui Shan[1], Zhuangqi Cao[1] and **Xianfeng Chen[1,2,3,4]**

[1]Department of Physics and Astronomy, Shanghai Jiao Tong University, China
[2]Shanghai Research Center for Quantum Science, China
[3]Jinan Institute of Quantum Technology, China
[4]Collaborative Innovation Center of Light Manipulations and Applications, Shandong Normal University, China

In the applications of optical communication and light-matter interaction manipulation, the capability of on-demand lasing output with programmable and continuous wavelength tunability over a broad spectral range under low threshold is key functionality. However, the ability to control multiwavelength lasing characteristics within a small mode volume with high reconfigurability remains challenging. The number of dyes and the emission wavelengths of existing materials always restrict the color gamut. In this Letter, we introduce a selection of emission wavelength laser by injecting Rhodamine 6G solution mixed with Au nanoparticles in the metal-cladded slab-capillary hybrid microcavity. A mechanism for tuning laser emission wavelengths is designed by manipulating the diameter of Au nanoparticles in Rhodamine 6G solution. Precision control of distinctive lasing wavelengths and a narrower peak are achieved, along with a stable lasing beam output from both ends of the capillary due to coherent superposition. Our findings offer possibilities for realizing a micro selection of emission wavelength laser from a single overall structure.

Biography

Hong Yang received a B.E. degree from Minzu University of China in 2019. She is currently working toward a Ph.D. degree in Physics with the School of Physics and Astronomy, at Shanghai Jiao Tong University, China. Her research interests include biophotonics and guided wave optics.

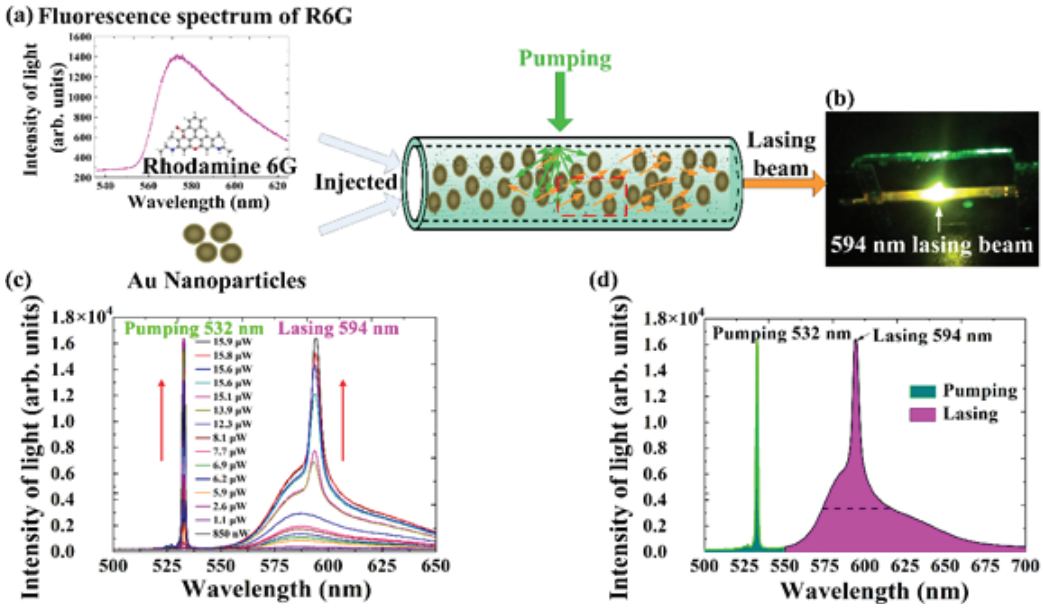

FIG. 1. Laser emission in the capillary hybrid microcavity. (a) Fluorescence spectrum of R6G. (b) Injection of Au nanoparticles and R6G into the capillary under the action of pump light can catch the lasing beam. (c) Approximately 594 nm laser beam after passing through the transmissive narrow-band filter. (d) The laser intensity at approximately 594 nm varies with the pump light at 532 nm. (e) The spectrum of the pumping and laser beam using the spectrograph.

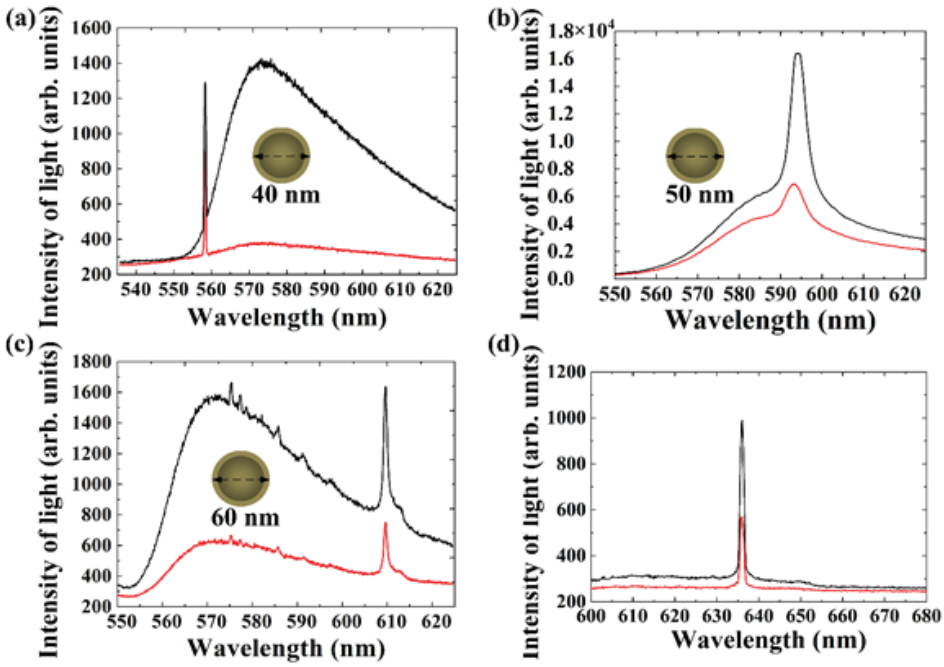

FIG. 2. Comparison of laser beams after injecting Au nanoparticles with different diameters. (a)–(c) The intensity of light from the capillary mixed with Au nanoparticles of 40, 50, and 60 nm. The black line corresponds to a stronger pump light power (10 μW) while the red line corresponds to a pump light power of approximately 5 μW. (d) The intensity of light from the capillary without Au nanoparticles.

Focusing of surface plasmon wave for small molecules sensing

Hailang Dai, Hongrui Shan and **Xianfeng Chen**

School of Physics and Astronomy, Shanghai JiaoTong University, China

The miniaturized manipulation and control of surface plasmon waves have long been a desirable goal. However, conventional nano methods have high losses and uncontrollable outcomes, which limit their utility in light-matter interaction. To overcome these challenges, we propose a method for achieving directional propagation and concentration of surface plasmon waves using micro/nanostructures. By focusing the transmission of surface plasmon waves on the tip of a nanotriangle, we are able to enhance the power of light by an order of magnitude. This design can be applied to sensing small molecules, both living and non-living. We believe that it will be realized the real-time miniaturized and integrated biosensor on chip.

Biography

Shanghai Super-postdoctoral Fellow. Hailang Dai received his PhD degree from Shanghai Jiao Tong University with the advisor Prof. Xianfeng Chen in 2019. He was a postdoctoral scholar in Xianfeng Chen lab at Shanghai Jiao Tong University. He joined Shanghai Jiao Tong University as an Assistant Researcher. His research interests focus on advanced optoelectronic devices, biomedical and biophotonics fields. He has published more than 40 articles.

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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

My research work mainly focuses on the construction and function of DNA nanomachines, which are cutting-edge and challenging topics. I 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, I achieved nano-specific precision in organizing plasmonic nanoparticles on the nano DNA frameworks. My work 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. I have also been working on multilayered hybrid magnetic nanoparticles for applications in nanomedicine for the last three years.

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Carvacrol-loaded hyaluronic-acid coated PLGA-nanoparticles for anti-inflammatory and antinociceptive activity

S. Salathia[1], M. R. Gigliobianco[1], Cristina Casadidio[1], Roberta Censi[1] and **Piera Di Martino[2]**
[1]School of Pharmacy, University of Camerino, Italy
[2]Department of Pharmacy, Università "G. D'Annunzio" Chieti e Pescara, Italy

Millions of people suffer from chronic pain induced by nerve injury. It has been challenging to understand the neuronal response responsible for this pain. However, the nervous and immune systems go hand in hand in causing neuropathic pain. The immune system's first response is to induce inflammation at the site of injury, and macrophages have been recognised to play an important role in the subsequent modulation of neuropathic pain. Hyaluronic acid (HA) is a well-known binder for the CD-44 receptor on classically activated M1-macrophages. This targeted approach of HA can be used with the biocompatibility of PLGA to encapsulate carvacrol that modulates pain and inflammation. Single emulsion solvent evaporation method is used to synthesize PLGA nanoparticles. Charge interaction is used for the binding of HA and PLGA with assistance from CTAB. The varied molecular weight and concentration of HA determine the size and charge of the nanosystem. Successful coating of HA on PLGA-CTAB particles is determined by the final charge and the nanosize is optimised for effective macrophageal uptake. Particle size before and after coating with 1.5% HA was found to be 162 nm and 287 nm, respectively. The zeta potential for PLGA-CTAB particles was found to be 57.7 mV and for PLGA-CTAB-HA it was -25.5 mV. The presence of a negative zeta potential indicated the successful coating of HA on PLGA-CTAB particles. Carvacrol-loaded nanoparticles had a size of 282 nm. Further optimization studies would include drug release studies in different media that mimic the *in vivo* inflammatory environment and *in vitro* and *in vivo* studies to check the efficacy of the nanosystem.

Biography

Saniya Salathia is an MSCA-ITN-PIANO PhD student at the School of Pharmacy, University of Camerino, Italy. She has previously completed her M.Tech (Nanotechnology) from Amity University, India, for which the final thesis was researched and conducted at Technische Universität Dresden, Germany. She has a passion for designing nanosystems that can solve major pharmaceutical problems with drug delivery and efficiency. In the meantime when she is not in the laboratory optimizing the size of nanoparticles, she likes to read books with a hot cup of chocolate. She only wishes to hope that someday her work will leave a minor mark on the scientific community.

Non-invasive technique for the design of composite materials

D. Rubio
ITECA (CONICET-UNSAM) Centro de Matemática Aplicada-ECyT-Universisdad Nacional de San Martín, Argentina

The use of multilayer materials has become of great interest in various industries, from food to aeronautics and nanotechnology. This is because, thanks to the combination of different components, the material obtained can have a combination of electrical, magnetic, thermal and mechanical properties that none of the component materials have. These macroscopic properties of the resulting material are known as effective materials, which are not simply obtained by adding or averaging the properties of different materials. Inverse problem techniques provide non-invasive mathematical tools to estimate effective properties knowing the composition of the material. The objective of this work is to obtain a non-invasive tool that allows determining materials that should be incorporated into a given composite material, and in what proportion, to obtain a certain effective property. These techniques together with numerical simulation offer the advantage of not requiring the fabrication of the material to determine its properties. In the presentation, examples will be shown and possible drawbacks will be discussed.

Biography

Diana Rubio is a professor at the National University of San Martín, Argentina. Her area of interest includes mathematical modeling, parameter estimation and inverse problems in general, numerical simulation, control of dynamic systems, with applications to different sciences. She published several articles in scientific journals on a variety of problems that arise in different disciplines such as physics, biology, health, materials. She graduated in Mathematics with an applied orientation from the University of Buenos Aires, Master of Science and PhD in Mathematics from Virginia Tech, USA. Since 2021 she is the president of ARSIAM (Argentine Section of SIAM).

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"The humanization of chemical species "Path to the hidden reality""

Oscar A. Anunziata

Research Center for Nanoscience and Nanotechnology. National Technological University, Argentina.

This work is multidisciplinary and brings together aspects of Quantum Physic chemistry, Physics, Chemistry and Epistemology/Semiotics. By exploring topics ranging from materials to design, it also seeks to elucidate the underlying connections between the natural (visible reality) and the artificial (hidden reality), and experiment and modeling.

The results are intended to contain elements of discovery and surprise that often accompany the gaining of new knowledge toward a new conception of the architecture and function of the mass of matter and energy that sustains our thoughts.

We conceive of Reality as everything that is detected by our senses, and especially that which is visible to our eyes, or which, aided by the development of high-tech equipment, we can detect. Nevertheless, is this reality the only one? This conception does not explain phenomena that occur in the Cosmological Nature, so my proposal is that other "Hidden" realities exist but we do not detect them, or that they simply do not exist.

After "humanizing" (giving the attribution of thinking, responding, acting), to species that we do not conceive to have "Life" such as atoms, to cite one, every particle that makes up the mass of matter and energy of the Universe led me to the "creation of a New chemical species" (C-Zr-SO_4H_2), recently reported1.

This attribution ascribed to mass/energetic species, without neural systems, led me after three years to conceive the Idea of Hidden Reality and to generate a possible mechanism (architecture), of how we think when our objective is to hit an "invisible target", or to "create" new targets.

Abstraction. The symbolic abstraction (inscrutable variables). Abstract Symbolism (parameterization of abstract variables). Symbolic Reality (expression of mass of matter or energy indefinite, but symbolized). Real Symbolism (parameterization of functional variables that replicate the Hidden Reality). From Hidden Reality to Detectable Reality.

Biography

Oscar A. Anunziata is Founding Director of the Nanoscience and Nanotechnology Research Center (NANOTEC), and Academic Director of the PhD Program in Chemical Engineering at the Universidad Technological Nacional, Córdoba, Argentina (UTN-FRC). His research interests include Design, synthesis, characterization, tailoring and modification of microporous (Zeolites) and MS 41 and SBA's and OMC, graphene and CNT. Incorporation of organic molecular nanowires, and their application as semiconductors and LEDs. Controlled drug release from nanostructures, H2 reservoirs. He obtained his Ph.D. with distinction, in Chemical Sciences at the National University of Cordoba, Argentina, in 1987. He made postdoctoral stays in Spain, Belgium and France. He is a Specialist in Epistemology and Semiotics (Argentina-Spain, 2013). He has received several distinguished awards. He is the author of more than 110 articles in high impact index (94 papers in journals, 4 books and 7 book chapters), and more than 350 presentations in Symposia and International Congresses.

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Synthesis of EDTA-functionalized graphene oxide-chitosan nanocomposite for simultaneous removal of inorganic and organic pollutants from complex wastewater

Monu Verma and **Hyunook Kim**

Department of Environmental Engineering, University of Seoul, Republic of Korea

Discharging of inorganic and organic pollutants creates a serious threat to the human health and the environment. In the current work, we have synthesized Ethylenediaminetetraacetic acid (EDTA) functionalized graphene oxide-chitosan nanocomposite (GO-EDTA-CS) for simultaneous removal of inorganic (i.e., mercury (Hg(II) and copper (Cu(II)) and organic pollutants (i.e., methylene blue (MB) and crystal violet (CV)) from wastewater via adsorption process. The structural, functional, morphological, elemental compositions, surface area and thermal properties of the synthesized nanocomposite were identified using powder X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), field scanning electron microscopy (FESEM), energy dispersive spectroscopy (EDS), Brunauer-Emmett-Teller (BET), and thermogravimetric analyzer (TGA), respectively. Different batch adsorption experiments such as pH effect, contact time, initial pollutants concentration, reusability etc. were studied in monocomponent system to optimize the results. The adsorption process apparently followed pseudo-second-order (PSO) kinetics for both pollutants, however the adsorption kinetics was also explained by the intraparticle diffusion model. The isotherm data for both metals ions and dyes were well fit by the Langmuir isotherm model. The maximum adsorption capacities of the adsorbent were determined 324±3.30, 130±2.80, 141±6.60, and 121±3.50 mg g^{-1} for Hg(II), Cu(II), MB, and CV, respectively. The excellent adsorption capacity was attributed to the availability of various active functional groups (e.g., -COOH, -OH, -NH2, etc.) on the adsorbent. The EDS, elemental mapping and FTIR analysis performed before and after the adsorption of heavy metals and dyes by GO-EDTA-CS confirmed the simultaneous adsorption of the pollutants. Moreover, GO-EDTA-CS could maintain its adsorption capacity for both inorganic and organic pollutants even after seven cycles of adsorption-desorption, indicating itself a promising adsorbent for practical wastewater treatment containing both inorganic and organic toxic pollutants.

Biography

Dr. Monu Verma is a research professor at Environmental Engineering, University of Seoul, Korea, and currently working on water treatment using different processes. Dr Verma earned his M.S. degree in Chemistry from CCS University, Meerut in 2011, and a Ph.D. from IIT Roorkee, Roorkee, India in 2000. Dr Verma is currently working in adsorption and heterogeneous catalysts filed in wastewater treatment. He has published more than 40 SCI journal papers and made many conference presentations. He has received top fellowship of South Korea as brain Pool (BP).

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Manufacture of electrospun multi-layer membrane for application of artificial ureters and ureteral stents

Jeong Chan Lee[1] and **Cheol Sang Kim**[1,2,3]

[1]*Department of Bionanotechnology and Bioconvergence Engineering, Jeonbuk National University, Republic of Korea*

[2]*Division of Mechanical Design Engineering, Jeonbuk National University, Republic of Korea*

[3]*Department of Nano-Bio Mechanical System Engineering, Jeonbuk National University, Republic of Korea*

The ureter is a 2~10mm tube that carries urine from the kidneys from the renal pelvis to the bladder. Ureteral stenosis refers to a state in which the ureter is obstructed due to damage to the ureter due to a stone or trauma such as surgery. Treatment is performed by dilating the narrowed area with a stent or by using a ureteral splint. However, the recurrence rate after treatment is very high, over 80%. In addition, the ureteral splint has the disadvantage of having to be replaced every 3 months. Patients experience discomfort and pain during treatment and placement.

In this study, it was shown that electrospinning technology can be used to manufacture tubes of various diameters similar to the actual ureteral size. Manufactured artificial conduit was manufactured with a double-layer membrane. Adding cinnamon essential oil, a representative antibacterial substance, to PCL, a biodegradable polymer, was intended to prevent the accumulation of foreign substances and the formation of stones due to the formation of bio-sludge, which is the main cause of ureteral stricture. In addition, by coating PVDF, a piezoelectric polymer, the current is generated by the piezoelectric effect according to the flow of body fluids or muscle movement, and it is intended to give the effect of treating inflammation or malignant tumors.

When using a manufactured prosthetic catheter, restenosis and rapid replacement cycle can be extended by preventing the accumulation of foreign substances inside through antibacterial and biodegradable properties. In addition, it is expected to be able to treat inflammation or malignant tumors in tissues by generating voltage using the piezoelectric effect. In addition, since conduits of various diameters and lengths can be manufactured, it is expected to be applicable to various tissues in the body.

Biography

Jeong Chan Lee is currently a PhD student at the Jeonbuk national University. Research on nanofiber coating technology for medical devices using electrospinning technology is in progress. He has published numerous first-author and co-author papers in SCIE journals. Awarded in the poster category at the 2022 Spring Conference of 'Korea Interventional Medical Device Society'.

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Development of absorption-type oil skimmer for high-speed refinement of cutting oil

Jun Hee Lee[1,2], Sung Min Bae[3] and **Chan Hee Park[2]**
[1]*BLUESEAL. Co., Republic of Korea*
[2]*Jeonbuk National University, Republic of Korea*
[3]*Hyundai Motor Company. Co., Ltd., Republic of Korea*

Cutting oil is almost indispensable in the use of machine tools. It is collected in a separate storage tank and reused repeatedly, but it gradually gets contaminated by the inflow of lubricants, oil from raw materials, and various foreign substances. An oil skimmer is commonly used as a device to remove waste oil from the top of a tank where contaminants are mixed. However, it is difficult to achieve the required removal efficiency with the conventional method of scraping the oil from the surface of the flat belt.

In this study, dopamine was coated on the sponge to improve its absorption function. Nano-sized dopamine particles coated inside the sponge cells formed a hydrophobic interface, adsorbing oil and releasing water. The sponge surface treated with dopamine nanoparticles absorbed oil at a faster rate than the control group (No treatment) and captured a larger amount of oil.

An absorber belt using this sponge material was developed, and an oil-water separation system was created to remove waste oil in the cutting oil tank. This system filtered more than 12 times more oil than the existing oil skimmer. The developed absorption-type oil skimmer was installed in an actual automobile manufacturing plant, and its industrial effectiveness was verified.

Biography

- CEO of BLUESEAL, a startup company related to nanomaterial manufacturing facilities, laboratory facilities, and heat transfer fiber materials
- Ph.D. candidate researching Nano Energy Transfer Materials at Jeonbuk National University

Research Topics:
1. Advanced Heat Transfer technology using Nano materials
2. Development of nano composite fiber manufacturing process
3. Advanced material-based functional sensor and control & measurement system

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Designing and characterization of curcumin-loaded nanotechnological dressings: A promising platform for skin burn treatment

Cristiana Lima Dora[1], Gabriela de Moraes Soares Araújo[1], Jamile Lima Rodrigues[1], Virginia Campello Yurgel[1], Carla Silva[2], Artur Manuel Cavaco Paulo[2] and **Ana Isabel Saì Loureiro[2]**

[1]Nanotechnology Laboratory, Federal University of Rio Grande, Brazil
[2]CEB - Centre of Biological Engineering, University of Minho, Portugal

Burns affect the skin and appendages, impair their function, and become favorable regions for bacterial infections. Owing to time-consuming and costly treatments, burns have been considered a public health problem. The limitations of the treatments used for burns have motivated the search for more efficient alternatives. Curcumin has several potential properties such as anti-inflammatory, healing, and antimicrobial activities. However, this compound is unstable and has low bioavailability. Therefore, nanotechnology could offer a solution for its application. This study aimed to develop and characterize dressings (or gauzes) impregnated with curcumin nanoemulsions that were prepared using two different techniques as a promising platform for skin burn treatment. In addition, the effect of cationization on curcumin release from the gauze was evaluated. Nano- emulsions were successfully prepared using two methods, ultrasound and a high-pressure homogenizer, with sizes of 135 nm and 144.55 nm, respectively. These nanoemulsions exhibited a low polydispersity index, adequate zeta potential, high encapsulation efficiency, and stability for up to 120 d. *In vitro* assays demonstrated a controlled release of curcumin between 2 and 240 h. No cytotoxicity was observed at concentrations of cur- cumin up to 75 µg/mL, and cell proliferation was observed. The incorporation of nanoemulsions in the gauze was successfully achieved, and the evaluation of curcumin release showed a faster release from cationized gauzes, whereas the non-cationized gauze promoted a more constant release.

Biography

Cristiana Lima Dora holds a degree in Pharmacy and a PhD in Pharmacy from the Federal University of Santa Catarina Catarina with sandwich internship at Université Joseph Fourier (France) (2010). She is Professor of Pharmacology at the Institute of Biological Sciences at the Federal University of Rio Grande (FURG) and permanent professor of the Graduate Programs in Health Sciences and in Engineering and Food Sciences. She is leader of the Nanotechnology and Pharmacology Research Group and coordinator of the Nanotechnology Laboratory (LabNano) at FURG. She is mainly interested in the development of nanocarriers for the pharmaceutical, cosmetic, food and agribusiness sectors and in the evaluation of the activity of products developed in cell culture and in animal models.

RAI – responsible artificial intelligence, a short analysis

Fernando Buarque de Lima Neto

Computing Engineering Program, University of Pernambuco, Brazil

Current advances in Machine Learning and Artificial Intelligence are many and often surprising. So far, these advances have mostly focused on qualitative results (for example, creating metaheuristic algorithms that can solve complex engineering problems), which generally leave users well served. However, it is troublesome the facts that most algorithms produced and used are (1) oblivious to what they actually are accomplishing and (2) have few social and moral references. In the talk a more reasonable, responsible and conscious type of AI will be presented and commented upon. In addition, the importance and implications of these innovations to Engineering will be discussed with the audience.

Biography

Prof. Buarque is PhD in Artificial Intelligence (Imperial College London-2002), Associate Professor and research leader in AI at the University of Pernambuco-Brazil, has supervised more than 120 students and authored of 6 books, and more than 240 scientific publications. His current research addresses complex decision problems, through rational/explainable evolutionary and social processes. He thinks that Responsible AI can lead to prosperous and happy societies.

Terahertz antenna based on graphene material for breast tumor detection

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[1]*Research Laboratory Smart Electricity ICT, SEICT, LR18ES44, University of Carthage, Tunisia*
[2]*Centre Tenologic de Telecommunication de catalunya (CTTC/CERCA), Spain*
[3]*SERCOM-Lab, EPT Université de Carthage,Tunisia*
[4]*Laboratory of Advanced Systems (L.A.S), Carthage University,Tunisia*

In this paper, two different types of graphene-based rectangular patch antennas are designed for broadband terahertz applications. First, a patch antenna is modeled using copper metal for terahertz applications. The simulation results show a degraded reflection coefficient due to the use of copper. Therefore, the reflection coefficient is above -10dB at 4.6 THz, then a VSWR is less than 3dB when we used copper for the top patch. The patch antenna results are improved when graphene material is used, which has good conductivity, as demonstrated through simulations. Furthermore, an increasing band-width of 1 THz instead to 0.8 THz when we used the graphene material, due to a better impedance match. On the other hand, we achieved a slight increase in gain and the VSWR is less than 2dB inside the available bandwidth. The time-domain solver of CST MWS software is used to evaluate the performance of the SIW (Substrate Integrated Waveguide) patch antennas. The SIW, PBG technology and the graphene material makes the antenna very important due to performance, such as the gain increases to about 7dB, the bandwidth is about 1.6 THz duo to increase the chemical potential of the graphene material. The results obtained with CST are compared with simulations using HFSS to validate the design further. In addition, the 10g peak skin SAR values of the antenna are 1.726e7 W/Kg instead of 9.55e5 W/Kg. In these results we conclude the antenna can detect tumor presence.

Biography

Was born in KEF Village, Tunis in 1990. He received the B.S. and M.S. degrees in National Engineering School of Carthage from the University of Carthage, in 2015 and the Ph.D. degree in electrical engineering (Microwave electronic domain) from University of Carthage, Tunis, in 2021. From 2016 to 2021, he was a Research Assistant at Intelligent Electricity & ICT Research Laboratory, ET TIC Lab. Then he was a Research Assistant at Centre Tecnològic de Telecomunicacions de Catalunya (CTTC).

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Complexity-based risk decision framework for cost overrun using fuzzy Bayesian network

Imran Ahmed Shah[1] and **Farman Afzal**[2]
[1]*Universiti Malaysia Perlis, Malaysia*
[2]*Institute of Business and Management, University of Engineering and Technology, Pakistan*

This study adheres to find important complexity-risk interdependent causes of cost overrun in infrastructure transport projects rather considering an independent state of project risk. Aiming for addressing cost overrun problem to facilitate decision-makers, a hierarchical breakdown structure of complex elements and complexity-driven risk factors at different levels of severity is conceptualized along with their interdependency network of key relationships. In this work, an integrated approach of fuzzy logic with the Bayesian belief network is employed for cost-risk assessment while assuming linguistic scales of likelihood and consequences parameters. The simulated results of cost-risk decision framework imply that poor design issues, increase in material prices and delay in relocating facilities show higher complexity-risk dependency and increase the risk of cost overrun in complex projects. This study contributes to the body of knowledge by providing a practical hybrid risk decision framework to identify and evaluate the key complexity-risk interdependencies in underline relations to the cost overrun problem in construction.

Biography

Dr. Shah Imran Ahmed is currently working as Assistant Professor and Head of the Department at Shah Abdul Latif, Campus Ghotki University, He has done Post Doc from University of Malaysia Perlis in 2021, he did PhD from University of Electronic Science and Technology of China in 2020 in the field of Occupational Psychology.

Dr. is Certified Master trainer and Motivational Speaker.

Dr. Shah is author of 36 research papers which are published in well reputed journals. He has presented his articles in many international conferences.

Dr. Imran is author of 3 books. He has published book chapters in different Book chapter series.

Dr. Shah's area of interest is Organizational Psychology, HRM, Leadership and Team Management.

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Advances of high-voltage consolidation of powder materals

E. Grigoryev[5], V. Goltsev[1], A. Osintsev[1], E. Strizhakov[2], S. Nescoromniy[2], S. Ageev[2,5], A. Chumakov[3], I. Nikonchuk[3] and **O. Kuznechik[4]**
[1]NRNU "MEPhI", Russia
[2]DSTU, Russia
[3]B.I.Stepanov Institute of Physics, Belarus
[4]SSI PMI, Belarus
[5]ISMAN, Russia

The main features of the method of high-voltage consolidation of powder materials and the resulting advantages and limitations of this method are considered. The method of high-voltage consolidation of powders is effective for the production of refractory composite materials that retain their strength properties at ultrahigh temperatures under aggressive external influences. The short duration of high-temperature exposure in the process of high-voltage consolidation makes it possible to preserve the structural-phase state of the initial powder material in the consolidated compact material. A feature of this method is the high density concentration of the released energy in the area of contacts between powder particles. Along with the characteristics of the powder, the determining factors are: the rate of input of the energy of the electromagnetic field into the powder material, the magnitude and nature of the mechanical pressure acting on the powder compact in the process of high-voltage consolidation. The high energy density in the particle contact zones leads to a local change in the state of aggregation of the powder substance in these zones. Along with the inhomogeneity of powder heating in interparticle contacts, a macroscopically inhomogeneous distribution of the current density in the volume of the consolidated sample is possible. The formation of the structure of a powder material during high-voltage consolidation is determined by processes of different scales occurring at interparticle contacts, in powder particles, in the bulk of the entire sample, and by the mutual influence of these processes. Further development of this method is associated with a detailed experimental study of thermal processes during high-voltage consolidation of powders of refractory materials using pulsed photometry. Registration of the parameters of a high-voltage current pulse and the intensity of thermal radiation of the consolidated powder materials was carried out using a measuring complex developed by the authors.

Biography

Dr. Evgeny Grigoryev studied theoretical nuclear physics at Moscow Engineering Physics Institute (MEPhI), Russia and graduated as MS in 1975. He received his PhD degree in 1980 at the same institution. He has the next work experience In Moscow Engineering Physics Institute: Researcher, Senior Researcher, Associate Professor, Leading Researcher, Scientific Chief of Key Laboratory of Electromagnetic Field-Assisted Methods for Processing of Novel Materials. Since 2017 to the present, Grigoryev is the Head of the Laboratory of High-Energy Methods for the Synthesis of Ultrahigh-Temperature Ceramic Materials in Merzhanov Institute of Structural Macrokinetics and Materials Science Russian Academy of Sciences. He has published more than 180 research articles in SCI(E) journals, 23 patents.

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Using DEA models to separate units in accordance with the nano intellect

V. Krivonozhko[1], A. Afanasiev[2] and **A. Lychev[1]**
[1]National University of Science and Technology MISIS, Russia
[2]Institute for Information Transmission Problems, Russia

The data envelopment analysis (DEA) approach has been widely used in order to analyze the activities of complex production units (industrial enterprises, factories, production plants, service companies, etc.). An important role in such analysis is played by the calculations of various indicators of the activity of units: efficiency scores, returns to scale, marginal rates of substitutions, transformations, etc. Special optimization models are used to determine dependencies between variables in the DEA models. Such dependencies allow managers and investigators to find special difficulties in the models and to improve such models. This paper presents and compares some of the best known methods for calculating such dependencies. Computational experiments show that the approach proposed by the authors has certain advantages over other methods. As a result we can divide production units into groups and to use them in accordance with their efficiency scores in the enterprise management. The approach proposed by the authors for estimation different indicators in nonradial DEA models can be used with parallel computations. Indeed, the original large problem can be divided into a number of subproblems; these subproblems are solved independently, and then partial solutions are combined to obtain a solution of the original problem. The approach proposed by the authors is a new direction in solving high-dimensional problems, it permits considerably shortening the calculation time and improving the numerical stability of solutions in nonradial DEA models.

Biography

Prof. Vladimir Krivonozhko has been working with the Institute for Systems Analysis of Russian Academy of Science since the moment of the foundation of this Institute. His doctor's thesis was devoted to the development of decomposition methods that was defended in 1996. Since 2015 he is Head of Laboratory of analysis of complex socio-economic and industrial systems, National University of Science and Technology MISIS.

Invariant manifolds of integrable equations and their applications

I.T. Habibullin and **A. R. Khakimova**

Institute of Mathematics, Ufa Federal Research Centre, Russian Academy of Sciences, Russia

The report discusses a method for studying nonlinear PDEs and their discrete analogs, based on the concept of generalized invariant manifolds (GIM). Our approach provides an efficient tool for obtaining such important attributes of integrable equations as the recursion operator and the Lax pair. It can be used for constructing explicit solutions as well.

Let us briefly explain the essence of the method (see [1], [2]). First we linearize the equation under consideration around its arbitrary solution u, i.e. we find its Fréchet derivative. Then we construct a differential (respectively, difference) equation compatible with the linearized equation for any choice of u. This equation defines a surface called a generalized invariant manifold (GIM). In a sense, the manifold generalizes the symmetry, which is also a solution to the linearized equation. It is noteworthy that the GIM solutions can be used for determining both classical and generalized symmetries of the original equation. Generalized invariant manifold can be applied for searching algebra-geometric solutions as well. Detailed explanation and illustrative examples can be found in the articles [1]-[4]. In [3] the generalized invariant manifold for the well-known NLS and MKdV equations are evaluated, from which Dubrovin type equations are derived describing algebra-geometric solutions. In [4], [5] the Ruijsenaars-Toda lattice equation and the Volterra chain are investigated. By using the method of OIM new explicit solutions for the Ruijsenaars-Toda lattice are found expressed through Jacobi and Weierstrass elliptic functions.

Biography

Head of Department of Mathematical Physics, Professor, Institute of Mathematics with Computing Centre - Subdivision of the Ufa Federal Research Centre of the Russian Academy of Sciences, Russia.

Research interests: Methods for solving nonlinear differential and discrete equations of mathematical physics; Symmetries and their applications in integrability theory; Integrability criteria for nonlinear partial differential equations and their discrete analogs, classification algorithms for integrable models. Characteristic Lie-Rinehart algebras of differential-difference equations. Classification of the integrable lattices in 3D via Darboux integrable reductions and characteristic algebras.

Supervisor experience: Five graduate students defended their PhD dissertations under my supervision: T.G. Kazakova, E.V. Gudkova, A.N. Vildanov, A.U. Sakieva, A.R. Khakimova.

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On the concept of continuum in the structural classical macro+micromechanics of materials and nonclassical nanomechanics of materials

J. Rushchitsky
Nesterov str. 3, S.P. Timoshenko Institute of Mechanics, Ukraine

Three theses relative to the concept of continuum are formulated and commented on. Thesis

1. The classical procedure of transition from the discrete structure to the continuum, which is substantiated in the macro-mechanics using the tools of analytical and statistical mechanics, has no alternative and is forced to be used in the micro- and nano-mechanics. Note that the notion of the continuum is fundamental in the structural mechanics which is divided into the structural macro-, micro-, and nano-mechanics of materials. The term "structural" means that the internal structure is taken into account in the mechanical models of material. The procedure above provides the transition from the body as a huge number of discrete particles (atoms, molecules) to the continuum, which is defined as the body in the same form, the physical characteristics (first of all, density) of which are given by the continuous functions. The central point here is the ergodic theorem.

Thesis 2. The mechanical properties of material are standardly determined on samples in the state of universal deformations (simple shear, uniaxial tension-compression, omniaxial tension-compression).

Note that it is extremely important because providing the universality of deformation implies that any piece of this material has the same mechanical properties. A violation of this rule leads to a misperception of these properties. This violation is frequently observed in publications on nano-mechanics. Thesis 3. In nano-mechanics, the analysis of structural members is often represented as the analysis of nano-material. In fact, both theoretically and experimentally determined property of nano-formation is is only the property of this formation.

Biography

Professor DSc Jeremiah J. Rushchitsky is working as Head of Department at the S.P. Timoshenko Institute of Mechanics in Kyiv (Ukraine) starting in 1965. Member of the National Academy of Sciences of Ukraine and many international societies on mechanics. Author of 560 scientific publications, including 18 monographs. He published In scientific journals of the prestigious academies of sciences - Comptes Rendus de l'Academie des Sciences, Serie Mecanique; Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences; Atti dell'Accademia Peloritana dei Pericolanti, Classe di Scienze Fisiche, Matematiche e Naturali - French, English, and Italian, respectively. His book "Rushchitsky J.J. Theory of waves in materials. Copenhagen: Ventus Publishing ApS, 2011– 270p." is to present downloaded about 600,000 times. Last monograph - Rushchitsky J.J. Foundations of Mechanics of Materials. Copenhagen: Ventus Publishing ApS, 2021 - 276 p. The main area of scientific activity is linear and nonlinear mechanics of materials.

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Biological activity of nanoparticles via express bioluminescence assays: Comparison of toxic and antioxidant properties

N.S. Kudryasheva[1,2], E.S. Sushko[1], A.G. Kicheeva[1] and **O.V. Kolesnik[1]**

[1]Institute of Biophysics SB RAS, FRC KSC SB RAS, Russia

[2]Siberian Federal University, Russia

Biological effects of nanostructures are of significant interest for biomedicine and environmental technologies. The modifiability of nanoparticle surfaces diversifies their interactions with surrounding media and organisms. This complexity prevents the prediction of nanoparticle bioeffects based solely on physico-chemical characteristics; integral and nonspecific biological assessment methods should be involved. Bioluminescent assays are prospective candidates for the comparison of the biological activity of various nanoparticles (NPs) due to simplicity and high-throughput capacity. In current study, bacterial bioluminescence assays were adapted to monitor and compare bioeffects of different NPs. Cellular and enzymatic assays (luminous marine bacteria and their enzymatic reactions, respectively) were developed and applied to monitor toxicity, antioxidant activity and radioprotective properties of NPs; bioluminescence intensity was applied as a signaling physiological parameter. We used NPs differed in core structure and surface modification: fullerenols with different cage size and a number of oxygen substituents, iron oxide NPs with different surface modifications, and gold NPs. Two additional methods were applied: reactive oxygen species (ROS) content was estimated with a chemiluminescent luminol method, and bacterial size was monitored using electron microscopy. The peculiar bioeffects of NPs were explained with hydrophobic interactions, electron affinity and disturbing of ROS balance in the bioluminescence systems. Thus, the bioluminescence bioassays, cellular and enzymatic, are appropriate express tools for studying and comparing the bioeffects of NPs; the bioeffects can be further classified within a unified framework for rapid bioassessment.

Biography

Dr. prof. Nadezhda S Kudryasheva,

Doctor and Professor in Biophysics (Physics and Mathematics), Leader Researcher at Institute of Biophysics of Russian Academy of Sciences, Siberian Branch; and Professor at Siberian Federal University, Krasnoyarsk, Russia; Past Immediate President of SETAC RLB.

1982 Degree: M.Sc., Chemistry, Moscow State University, Moscow, USSR

1991 Degree: Ph.D., Biophysics.

2004 Degree: Dr.Sc., Biophysics,

2007 Degree: Professor

Mathematical modeling of a thermal converter with a cylindrical heat conductor and with a local heat source chosen on the basis of the scientific problem

P.M.Matyakubova, P.R.Ismatullaev and **N.I.Avazova**

Tashkent State Technical University, Uzbekistan

The paper deals with the issues of the functional diagram and justification of the efficiency of thermal converters for controlling the moisture content of the flow of liquid materials. In addition, two main types of physical models were identified in the work based on a pipeline section with radial holes, in which cylindrical probes with heating and temperature-sensitive elements are located across the flow of liquid material: with concentrated and distributed heat sources.

1. Based on the analysis of a generalized functional diagram and justification of the effectiveness of thermal converters for monitoring the moisture content of liquid materials, as well as on the basis of a pipeline segment with radial holes in which cylindrical probes with heating and temperature-sensitive elements are located across the flow of liquid material, two main types of physical models are identified: and distributed heat sources.
2. A mathematical model of thermal converters of moisture content of liquid materials with cylindrical heat pipes with concentrated and distributed heat sources based on matrix methods of thermal quadripoles has been obtained and analyzed.
3. It is shown that for the development of designs of thermal converters of moisture content of liquid materials, the most suitable are thermal systems with distributed heat sources based on a segment of a pipeline with radial holes in which tubular probes with cylindrical temperature-sensitive elements are located across the flow of liquid material, on the surface of which a heating winding is wound. element, which significantly increases their sensitivity, speed and reliability allows the use of standard semiconductor temperature-sensitive elements.
4. The obtained mathematical models of thermal converters with concentrated and distributed heat sources were analyzed and experiments were carried out, their suitability for analyzing the main characteristics, as well as for developing a methodology for designing thermal converters for moisture content of liquid materials, was revealed.

Biography

Matyakubova Parakhat Meyliyevna, doctor of technical sciences, professor Born in 1960 in Urganch, Khorezm region. She graduated from the Tashkent Institute of Electrotechnical Communication in 1985, majoring in "Automatic Electrical Communication". She started his career in 1983 as an engineer of the Communications Department of Urganch city, Khorezm region. Since 1991, she worked as a senior teacher and associate professor at Urganch State University, and later as an associate professor and scientific secretary at the Urganch branch of Tashkent University of Information Technologies. In 2010, she worked as an associate professor of Tashkent State Technical University, since 2012, as a professor of this educational institution, since 2013, as the head of the department. Parakhat Matyakubova trained many students in the fields of metrology, standardization and product quality management, technical regulation, and achieved scientific achievements together with them. She won prizes in several international competitions. In particular, she regularly participated in the "KIWIE - 2018", "KIWIE - 2019", "KIWIE - 2021", "KIWIE - 2022" exhibitions held in the Republic of South Korea on behalf of women inventors of the Republic of Uzbekistan, and won a 4-time gold medal and a grand prix in 2021. was In addition, she participated in "The 4th International Invention Innovation competition in Sanada, ICAN 2019 Toronto International Society of Innovation and Advanced Skills (TISIAS) ICAN 2019" - the 4th International Invention Innovation competition held in Toronto, Canada, and won the gold medal and was recognized as "Expert of the Year". Under her leadership, memorandums were signed with higher education institutions in Russia, South Korea, Germany, Canada, Belarus, Ukraine, Latvia, the United States of America, France, Kazakhstan and Turkey. She is also preparing educational and methodological complexes in cooperation with foreign scientists.

Nanoscaled silicon carbide on silicon: A new bandgap material for micro- and optoelectronics and its unique properties

S.A. Kukushkin and **A.V. Osipov**

Institute of Problems of Mechanical Engineering RAS, Russia

We report on the discovery of a new method for the synthesis of epitaxial films of nanoscale carbide on silicon and the development of the technology for its production. The method consists in the coordinated replacement of a part of the silicon matrix atoms by carbon atoms to form an epitaxial silicon carbide film. It was found experimentally that the process of Si matrix replacement occurs gradually without destroying its crystal structure. Film orientation is determined not only by the surface of the silicon substrate, but also by the crystal structure of the original silicon matrix. A comparison of the new growing method with the classical thin film growing methods is presented. The implementation of the substitution method made it possible to obtain a new type of template - a substrate with buffer transition layers, designed for growing wide-gap semiconductors on silicon, such as AlN, GaN and AlGaN. The formation of a new Si phase in the "semi-metallic" state at the SiC(111)/Si (111) interface was theoretically predicted and experimentally confirmed. The formation of Si in the "semi-metallic" state at the SiC/Si (111) interface is associated with large short-term "compressive pulses" during the Si to SiC transition. It is shown that the compression pressures arising in a thin boundary layer with a thickness of the order of several nanometers can reach values of the order of 200-250 GPa. Pressures of this magnitude lead to the formation of special, previously unknown optical, electrical, and magnetic properties of the SiC (111) / Si (111) interface. should give clear indication of the objectives, scope, results, methods used, and conclusion of your work. One figure and one table can be included in your results and discussions.

Biography

Prof. Sergey A. Kukushkin, Doctor of Science, PhD. He was born in 09. March 1954. Now is Head of laboratory of Problems of Mechanical Engineering, Russian Academy of Sciences (IPME RAS). Field of scientific interests: materials science and engineering, solid state physics, phase transitions, physics of semiconductors. Current research interests: thin films growth, growth of wide band gap semiconductors and nanostructures. Prof. S.A. Kukushkin is an author of over 400 scientific papers, including monographs and 12 major reviews. S.A Kukushkin (together A.V. Osipov) was discovered another unknown before mechanism of the growth of epitaxial films SiC on Si.

Andrey V. Osipov. Date of birth: 26.03.1965. Qualification: Doctor of Sciences. Research area: Quantum Chemistry, Thin-film Growth, Surface Science, and Phase Transitions. Present Position, Current Activity: Leader Researcher at the Institute of Problems of Mechanical Engineering, Russian Academy of Sciences, Laboratory of Structural and Phase Transitions in Condensed Matter. Current activity is to investigate different physical and chemical processes accompanied by new phase formation (such as thin-film growth, self-organization, nanopore formation, and self-assembly of quantum dots), develop theoretical and computer models of such processes, and coordinate theoretical and experimental work.

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Improving hydrophobicity and compatibility between kenaf fiber and polymer composite by surface treatment with inorganic nanoparticles

Mohammed Mohammed[1,2*], Rozyanty Rahman[1,2*], Aeshah M. Mohammed[3], Bashir O. Betar[5], Azlin F. Osman[1,2], Tijjani Adam[4], Omar S. Dahham[6,7] and **Subash C. B. Gopinath[2,8]**

[1]*Center of Excellence Geopolymer & Green Technology (CEGeoGTech), Universiti Malaysia Perlis, Malaysia*
[2]*Faculty of Chemical Engineering Technology, Universiti Malaysia Perlis (UniMAP), Malaysia*
[3]*University of Bagdad College of Education for Pure Science Ibn-Alhaitham*
[4]*Faculty of Electronics Engineering Technology, Universiti Malaysia Perlis, Malaysia*
[5]*Research Center (NANOCAT), University of Malaya, Malaysia*
[6]*Department of Petroleum and Gas Refinery Engineering, Al-Farabi University College, Iraq*
[7]*Department of Civil Engineering, Cihan University-Erbil, Kurdistan Region, Iraq*
[8]*Institute of Nano Electronic Engineering, Universiti Malaysia Perlis, Malaysia*

Compatibility of natural fiber with hydrophobic matrix is a herculean task in literature works. Surface treatment is a well-known approach for increasing the strength of interfacial adhesion between fibres and polymer matrices. Therefore, this study aims to examine the impact of surface treatment with zinc oxide nanoparticles (ZnONPs) in improving hydrophobicity of kenaf fiber (KF) to enhance the compatibility between KF and polymer matrix. In this study, KF reinforced unsaturated polyester composites (KF/UPE) were fabricated by the hand lay-up method with varying fiber loadings (wt %) of 10 20, 30, and 40. KF were treated with five different contents of ZnONPs (1% to 5 wt%) to make UPE/KF-ZnONPs composites. The composites were studied in terms of wetting response (contact angle measure and water absorption), mechanical properties, chemical structure (FTIR), crystalline structure (XRD), and surface morphology (SEM, AFM). The investigational findings indicate that the composite samples incorporating ZnONPs exhibit optimum hydrophobicity and mechanical properties, as they possessed a higher contact angle than the untreated KF composite. The optimum content of ZnONPs was found to be 2 wt%. Regarding water absorption, the untreated UPE/KF composites absorbed more water than the treated UPE/KF-ZnONPs composites. SEM images showed changes in the morphology of the KF, while FTIR analysis proved the presence of ZnONPs functional groups in the UPE/KF composites. AFM images revealed that the ZnONPs could actively produce nanolevel roughness, advantageous to the hydrophobic characteristics.

Biography

Education Background: Postdoctoral Program/Research in" Materials Engineering/Nano Materials. School of Engineering Materials/University Malaysia Perlis (UniMAP), Perlis- Malaysia. 2021-2022

Doctor of Philosophy (Ph.D.)/Research in" Materials Engineering/Nano Materials. School of Engineering Materials/ University Malaysia Perlis (UniMAP), Perlis- Malaysia. 2016-2021

My h-Index: 8 (scopus) and 11 (google scholar) Published 37 papers in SCOPUS indexed

Published papers in Q1-Q3journals:

Arabian Journal of Chemistry, IF=6.212 (Elsevier Publisher)

Polymer Testing, IF=4.931 (Elsevier Publisher)

Heliyon Journal, IF=3.776 (Elsevier Publisher)

Journal BioResources, IF=1.747

Journal of Renewable Materials, IF=2.115

Current nanoscience, IF=1.52 (Scopus).

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Foliar application of nanoclay promotes potato (*Solanum tuberosum* L.) growth and induces systemic resistance against potato virus Y

Dalia G. Aseel[1], Ahmed Abdelkhalek[1], Fatimah O. Alotibi[2], Marwa A. Samy[1], Abdulaziz A. Al-Askar[2], Amr A. Arishi[3] and **Elsayed E. Hafez[1]**

[1]Plant Protection and Biomolecular Diagnosis Department, Arid Lands Cultivation Research Institute, Egypt

[2]Department of Botany and Microbiology, King Saud University, Saudi Arabia

[3]School of Molecular Sciences, The University of Western Australia, Australia

Potato virus Y (PVY) is one of the most harmful phytopathogens. It causes big problems for potatoes and other important crops around the world. Nanoclays have been extensively studied for various biomedical applications. However, reports on their interactions with phytopathogens, particularly viral infections, are still limited. In this study, the protective activity of Egyptian nanoclay (CE) and standard nanoclay (CS) against PVY was evaluated on potato (*Solanum tuberosum* L.) plants. Their physicochemical and morphological properties were examined with scanning electron microscopy (SEM), transmission electron microscopy (TEM), Fourier-transform infrared spectroscopy (FTIR), and energy dispersive spectrometer (EDS). SEM and TEM analyses revealed that CE has a spherical and hexagonal structure ranging from 20 to 80 nm in size, while CS has boulder-like and tubular structures of about 320 nm in size. FTIR and EDS showed that both nanoclay types have different functional groups and contain many vital plant nutrients that are necessary for every stage and process of the plant, including development, productivity, and metabolism. Under greenhouse conditions, a 1% nanoclay foliar application enhanced potato growth, reduced disease symptoms, and reduced PVY accumulation levels compared with non-treated plants. Significant increases in levels of antioxidant enzymes (PPO and POX) and considerable decreases in oxidative stress markers (MDA and H_2O_2) were also reported. Moreover, a significant increase in the transcriptional levels of defense-related genes (PAL-1, PR-5, and CHI-2) was observed. All experiment and analysis results indicate that the CE type is more effective than the CS type against PVY infection. Based on these results, the foliar applications of nanoclay could be used to manage plant viral infections in a way that is both effective and environmentally friendly. To our knowledge, this is the first report of the antiviral activity of the foliar application of nanoclay against PVY infection.

Biography

Dr. Aseel studied Genetics at the Alexandria University, Scholarship of MSc advent from Academy of Scientific Research and Technology (ASRT) in 2010. She received her PhD degree in 2015 at Arid Lands Cultivation Research Institute (ALCRI), City of Scientific Research and Technological Applications (SRTA,City). Dr. Aseel is an Associate Professor at the same institution. Preface: Patent (No.1261) of the Potato Leafroll Virus Diagnostic Group Kit. She is a member of scientific societies like the Egyptian Society for the Biological Control of pests, American Microbiology society. She has a reviewer in international journals like; frontiers in plant science, and Archives of Phytopathology and Plant Protection. She has published more than 40 research articles in SCI (E) journals.

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Flow and thermal performance analysis in the crossflow of nanofluids over wing shaped tube bundles: A numerical study

S. Akçay
Çankırı Karatekin University,Turkey

Flow over tube bundles is one of the areas of study that has been of great interest for a long time. Tube bundles are a special example of heat exchangers where the heat transfer is between the hot fluid flowing through multiple tubes and the cold fluid flowing crosswise over the tubes. Crossflow is widely used in many engineering applications such as heating/cooling processes, air conditioning applications, and heat exchangers. On the other hand, it is common application to add nano-sized particles to conventional fluids to improve their thermophysical properties. The nanofluids improve the heat transfer rate depending on the particle volume fraction. For that reason, in this study, the flow and heat transfer in the crossflow passing over of wing-shaped tube bundles in the staggered configuration were numerically investigated. Simulations were conducted with the help of the ANSYS Fluent program. In the study, the wing-shaped tubes were placed in the tube bundle at two different attack angles (θ: 0° and 180°), and the results was compared with the circular tube bundle. The working fluid is the suspension of Al_2O_3 nanoparticles in water. Reynolds numbers in the range of $100 \leq Re \leq 500$ and particle volume fractions in range of $0 \leq \Phi \leq 0.04$ were used. To observe the effects of the attack angle, particle volume fractions and Reynolds numbers on thermal and flow fields, velocity and temperature contours were obtained. According to the findings, heat transfer improved with increasing particle volume fraction. For both the attack angles, Nusselt number (Nu) and performance factor (PF) increased with increasing Re and particle volume fractions. Friction factor (f) decreased with increasing Re.

Biography

Selma Akçay is a Asst. Professor in the Mechanical Engineering Department at Çankırı Karatekin University, Çankırı, Turkey. She completed her undergraduate education at Erciyes University, Kayseri, Turkey, in 2000. She received his PhD in Mechanical Engineering from the Aksaray University, Aksaray, Turkey, in 2021. Her current research focuses on heat and mass transfer, CFD, fluid dynamics, thermodynamics, pulsating flow, nanofluids, macro and microflows. She has many national and international publications on the applications of nanofluids in heat and mass transfer. She has participated in more than 30 national and international conferences and congresses with oral presentations.

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Production of activated carbon from gelidium and its effectiveness in crystal violet adsorption

Mikail Olam

Department of Chemical Engineering, Inonu University, Turkey

With the increase in population and the development of industry, wastes are also increasing. Today, various methods are used in the evaluation of these wastes (pyrolysis, carbonization, liquefaction, gasification). However, the use of economical, highly efficient and environmentally friendly adsorbents for the removal of dyes from wastewater has attracted great interest recently. In this study, gelidium were carbonized at 800°C and 90 min, and their carbonization yields, adsorption capacities, physical and chemical properties were investigated. X-ray diffraction (XRD), ultraviolet-visible spectroscopy (UV), Fourier-transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDX) and ultimate analysis were performed. In EDX analysis, gelidium contain many inorganic substances. According to XRD analysis, the structure of gelidium is semi-crystalline and the others are amorphous. According to UV, XRD and SEM analysis, the carbonization process promoted both crystallinity and formation of mesopore/micropore structures. The carbonization yield of gelidium was 39 %. The adsorption capacity and crystal violet (CV) removal were 9.63 mg/g and 96% at adsorbent dose of 0.5 g, initial dye concentration of 50 mg/L, 30°C, equilibration time of 60 min, and constant stirring speed of 200 rpm, respectively. The obtained results showed that gelidium can be used as a suitable adsorbent for the effective removal of dyes from aqueous solutions. It can be used as an alternative to existing commercial products due to their cost-effective and high adsorption capacity.

Biography

Mikiail Olam received the M.S. (2012) and PhD (2021) degrees in Mechanical Engineering from Firat University, Elaziğ, Turkey. He also received the M.S. degree in Chemical Engineering from Inonu University, Malatya, Turkey in 2019. His current research interests include material sicience and energy.

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The effect of current density on friction and wear properties of Ni/W/PTFE electro-co-deposited composite

Arif Karadağ[1], Erhan Duru[2], Mehmet Uysal[2], Serdar Aslan[2], Hatem Akbulut[2,3] and **Aslan Çoban[4]**

[1]Department of Machinery and Metal Technologies, Mus Alparslan University, Turkey
[2]Department of Metallurgy and Materials Engineering, Sakarya University, Turkey
[3]NESSTEC Energy & Surface Technologies A.S., Turkey
[4]Mechanical Engineering Department, Sakarya University of Applied Sciences, Turkey

This study reinforced Ni–W composites with polytetrafuoroethylene (PTFE) and deposited them on the low-carbon steel substrate by a pulse current (PC) electrodeposition technique. This resulted in improved abrasion resistance and low friction coefcient. The efect of current density on the co-depositions' surface morphology, nanohardness, friction and wear performances was investigated. Surface morphologies and worn surfaces of the produced composites were investigated by scanning electron microscopy (SEM). The phase structures of the deposited samples were analyzed using X-ray difraction (XRD) by calculating the crystallite size and lattice strain. The results showed that PTFE could efectively enhance the tribological performances of the nickel matrix. It was shown that there was an increase in the current density and the same trend was also observed in the amount of incorporated PTFE into the matrix for a certain level. When the deposition was operated at the current density of 10 A/dm^2, the average friction coeffcient of the composite coating was reduced to 0.24. Moreover, the wear rate of the co-deposition obtained at 10 A/dm^2 was signifcantly decreased, and this was attributed to the uniform distribution of PTFE and refning microstructure of Ni–W.

Biography

Arif Karadağ was born on July 7, 1982, in Arpaçay, Kars. After attending Oğuzlu Village Primary School and Başgedikler 60th Year Primary School, he graduated from Malatya Pütürge Vocational High School, Department of Metal Works, in 1999. In 2000, he began his higher education at ZKÜ Alaplı Vocational School of Higher Education in the Metallurgy Materials Program. He completed his undergraduate studies in 2008 at Sakarya University, Faculty of Technical Education, Department of Metal Works Teaching, with a thesis titled "The Effect of Welding Parameters on Seam Geometry and Mechanical Properties in TIG Welding of Aluminum Alloys." In 2011, he started working as a lecturer at Muş Alparslan University, where he is currently employed. In 2022, he completed his PhD research on "Tribologic, Mechanical, and Corrosive Behavior of Ni-W/PTFE Composite Coatings Produced by Electrodepositing Method" in the Manufacturing Engineering Department at Sakarya Applied Sciences University.

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Automatic minimization of the drift performance of RC 3D irregular buildings using genetic algorithm

Zakia SADAT and **Abdussamet ARSLAN**

Civil Engineering Department, Gazi University, Turkey

Structural irregularities are one of the major causes of damage amplification under lateral forces. One such form of irregularity is the presence of re-entrant corners and torsional irregularity, causing stress concentration due to sudden changes in stiffness and torsion amplification in buildings. The response and the behaviour of such a structural system under lateral loading conditions depend mainly on the size and shape arrangement of the vertical structural elements of the building. Structural optimization techniques should solve the problem to efficiently distribute materials throughout the structure to limit the torsional drift, thus minimizing torsion at each floor level of the building. This problem is considered as a sizing optimization problem. For this purpose, two structural models are selected to represent different structural systems. These structural models are eighth-story shear buildings. The optimization problem is formulated and implemented using MATLAB by employing a genetic algorithm (GA), which is computationally efficient in solving such types of optimization problem. The design variables consist of the columns and shear walls of the structure located in each story layout. The Turkish Earthquake Standard Code of Practice TEC-2007 guidelines are used to analyse and design buildings and as a constraint. The efficiency of the GA was examined and found to be good. All the solved problems proved that the results are economical and give maximum responses. Based on the findings of this research, we concluded that the GA is suitable for modelling practical design problems that consider variations in the cross-sectional dimensions of concrete columns and shear walls to obtain optimum seismic performance.

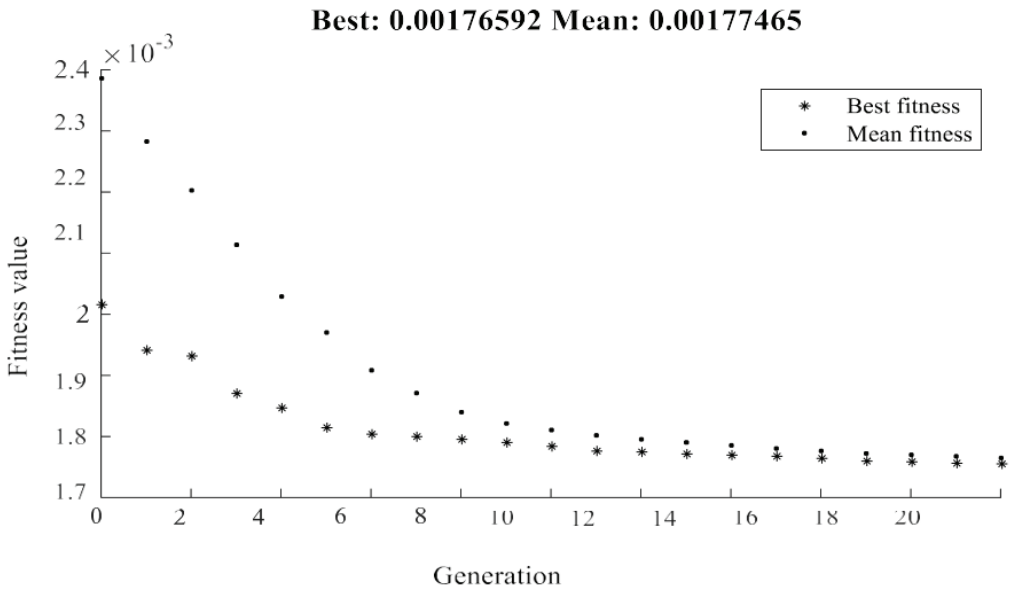

Figure A. *Convergence graph of the genetic algorithm*

Storey No	Initial solution Eccentricity (cm)	Optimum solution Eccentricity (cm)	Reduced Eccentricity (%)
8	42,7	4,51	89,4
7	40,97	4,68	88,6
6	38,45	4,64	87,9
5	36,44	5,52	84,8
4	34,96	7,12	79,6
3	34,33	9,52	72,2
2	36,02	13,58	62,3
1	46,26	20,83	55

Table A. *Comparison of initial and optimal solution of eccentricity*

Biography

My name is Zakia I received my bachelor's degree in civil engineering from Kabul Polytechnic University, Faculty of Construction, Civil and Industrial Construction Department, Afghanistan. I received my master's degree from Kabul Polytechnic University, Faculty of Construction, Civil and Industrial Construction Department. I worked as professor, design engineer and chief designer in Central Project Planning Institute (PAMA) and Ministry of Urban Development and Housing of Afghanistan for 14 years. I have designed and drawn various projects of multi- storey buildings such as residences, hospitals, schools, and mosques. I worked with different types of computer programs which are related to my profession. Thereafter, I received my Ph.D. degree from Gazi University, Faculty of Engineering, Civil Engineering Department in 2021. My doctoral thesis is on "Optimization and modelling of the effect of plan irregularity on seismic behaviour of buildings with artificial intelligence systems".

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A framework for librarians to inform the citizenry during disasters: Reflections on the COVID-19 pandemic

Chisita C.T[1] and **Ngulube P**[2]
[1]*Durban University of Technology, South Africa*
[2]*University of South Africa, South Africa*

Globally, the Coronavirus disease-2019 (COVID-19) has wreaked havoc on human lives and socio-economic activities at an unimaginable scale. African countries have not been spared from this debacle – as evidenced by media reports of loss of lives, lockdown, isolation and desolation coupled with the loss of livelihood. Whilst the COVID-19 pandemic rages, libraries find themselves at the epicentre of an unprecedented crisis in the form of an information deluge that requires a multi-thronged approach to ensure information hygienic practices in information management. To fight COVID-19, librarians and related information professionals with relevant tools should aim at helping prevent COVID-19 pandemic infodemic. This article explores how libraries and librarians can contribute to the fight against COVID-19 by waging wars for access to information amidst an avalanche of disinformation. This article analysed how librarians can proactively contribute to the battle against the COVID-19 pandemic through innovative strategies that ensure an informed citizenry. The study used qualitative content analysis as the study design. Documents were retrieved from trusted websites, and they were coded before analysis. The study found that librarians were not included in the national programmes to manage the COVID-19 pandemic. Yet, they possess the potential to contribute to the fight against misinformation by educating citizens on hygienic information practices, for example, by directing users to credible or trustworthy sources on the pandemic. The study concluded that librarians could be helpful to stakeholders in managing the COVID-19 pandemic and infodemic because knowledge and skills relating to critical literacies are crucial in the 21st century. It recommends a collaborative framework to help librarians ensure that the citizenry is not misinformed during emergencies.

Biography

A Senior Lecturer at the Durban University of Technology (DUT) in the Department of Information Systems in Durban, South Africa. Chisita holds a PhD in Information Sciences. He is a member of several Library Associations, such as IFLA and Zimbabwe Library Association, and the Secretary of the LIS Education & Training section, AfLIA

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Preparation of porous biochar from date palm petiole for the adsorption of hazardous dye

Hadj-Otmane Chahinez[1] and **Ouakouak Abdelkader**[1,2]

[1]*Research Laboratory in Subterranean and Surface Hydraulics, University of Biskra, Algeria*

[2]*Hydraulic and Civil Engineering Department, University of El Oued, Algeria*

Palm petiole is a very carbon-rich biomass widely used as an adsorbent in the field of water treatment and it is a potential adsorbent to remove dyes from aqueous solutions. In this work, three biochar were prepared from palm petiole at different temperature of pyrolysis (500° C, 600° C and 800 °C) with high textural properties to remove the hazardous cationic dye. The PP- biochar prepared (PP-500, PP-600 and PP-800) were characterized by several analysis such as: FTIR, N2 adsorption-desorption, TGA/DTG, BET analysis, SEM-EDX and phpzc. These Biochars are used to determine the effect of pyrolysis temperature for cationic dye removal. The results obtained show that these biochars have a very good surface which are as follows: SBET PP-500= 200.27, SBET PP-600=430.43, SBET PP-800=767.44. The pHpzc values ranged from 8.27 in the Biochar PP-500 which indicates basic surface charge to 5.80 in the biochar PP-800 to indicate acidic surface charge and the biochar PP-600 shows a neutral surface charge with phpzc equal to 7.68. This helps to give high efficiency in removing dyes from solution aqueous. Where the PP-600 biochar represents the highest absorption capacity of about 104 mg/g, after the PP-500 biochar with an adsorption capacity of 81 mg/g, and the PP-800 biochar with about 47mg/g. Finally, the PP-biochar have very good structural properties, which help it be one of the best adsorbents for removing dyes, in addition to being environmentally friendly and very economical.

Biography

Hadj-Otmane Chahinez, PhD student (5year old) in water sciences and environment at the University of Mohamed Khider Biskra, Algeria.

Member in the research laboratory in subterranean and surface hydraulics.

My scientific production is 03 published articles, one in Elsevier, the second in MDPI and the third one in springer, theirs DOI are as follows:

1. DOI: 10.1007/s13399-022-03127-3.
2. DOI: 10.3390/app112210722.
3. DOI: 10.1016/j.eti.2020.100872.

And more than 20 national and international communications, for more informations you can consults my profile on the researchgate: https://www.researchgate.net/profile/Hadj-Otmane-Chahinez-2.

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Molecular docking identifies promising SARS-CoV-2 3CLpro Inhibitor: A follow-up study on QSAR PSO-SVR model

Achouak Madani, Othmane Benkortbi and **Maamar Laidi**
Department of Process and Environmental Engineering, University of Yahia Fares, Algeria

This study presents a follow-up investigation to our previously published work on SARS-CoV-2 3CLpro inhibitors. The urgent need for effective therapeutics against SARS-CoV-2 has driven extensive research in drug discovery, and our previous findings laid the groundwork for this current study. In our earlier work, we employed a QSAR PSO-SVR model to predict the IC50 values for 71 molecules, aiming to identify potential candidates for inhibiting the viral 3CL protease, a crucial enzyme for viral replication. Building upon these predictions, we conducted molecular docking simulations on the same dataset using the robust Molegor software. The docking simulations provided detailed insights into the interactions between the 71 molecules and the viral 3CL protease. Remarkably, molecule 11 stood out with an exceptional MolDock score of -164.7, reaffirming its potency as a promising inhibitor. The consistency between the docking results and our initial QSAR predictions further validated the accuracy of our model. An essential discovery was the formation of critical pi-bonds and hydrogen bonds between molecule 11 and the active site residues of the viral protease. This finding illuminated the structural and chemical features responsible for its inhibitory potential and underscored its significance as a candidate for further exploration. The results highlight the potential of molecular docking as a powerful tool for identifying novel inhibitors against SARS-CoV-2 and other viral pathogens. To ascertain the therapeutic potential of molecule 11 against SARS-CoV-2, we propose further *in vitro* and *in vivo* experiments to validate its efficacy in combatting viral replication. In conclusion, this follow-up study reaffirms the efficacy of our QSAR model and emphasizes the value of molecular docking in early-stage drug discovery. Molecule 11's identification as a promising candidate opens up new avenues for the development of targeted therapeutics against SARS-CoV-2. As the global health crisis persists, our research contributes to the growing body of knowledge aimed at combatting this pandemic and preparing for future viral outbreaks. By leveraging computational and experimental approaches, we aim to accelerate the discovery of potential treatments that could alleviate the burden of COVID-19 on healthcare systems and save lives worldwide.

Biography

I am a third-year Pharmaceutical Engineering Ph.D. student specializing in Computer-Aided Drug Design. My research focuses on the extraction and characterization of active metabolites from local plants, as well as the development of physically crosslinked bio-hydrogels for controlled drug delivery. I have a keen interest in utilizing AI methods for drug design, repurposing, and repositioning to combat chronic and life-threatening diseases. I have contributed to the scientific community through publications of a book chapter and an article, and actively participate in national and international conferences to share my research findings.

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Methodological approaches to creation of nanocomposite materials based on polymer matrices

V.A. Goldade[1], S.V. Avdeychik[1], A.S. Antonov[2] and **V.A. Struk[2]**
[1]Francisk Skorina Gomel State University, Belarus
[2]Yanka Kupala Grodno State University, Belarus

Methodological principles for the creation of nanocomposite engineering materials with increased performance parameters based on industrial polymer and oligomeric materials have been developed. The essential basis of these principles is the proposed concept of energy and technological correspondence of the material components, which makes it possible to realize the phenomenon of nanostate of a material object at the stage of formation of nanocomposite structure at a given level of technological impact.

The proposed principles for the implementation of the nanostate phenomenon in the technology of composites based on industrial polymers make it possible to use not only nanosized particles, but also micron-sized particles with a characteristic energy state when creating materials. If the concept of energy and technological correspondence is observed, a nanocomposite structure with increased parameters of characteristics is formed due to the formation of a spatial network of physical bonds between macromolecules and the modifier. The formation of such bonds and their subsequent transformation make it possible to realize the synergistic effect of increasing the deformation-strength, tribological, adhesive characteristics and resistance to thermal and oxidative effects. Due to the formation of physical bonds between the macromolecules of polymeric and oligomeric matrices, the thermodynamic compatibility of the components of the composite material increases due to the manifestation of the function of a physical compatibilizer by nano-dispersed particles. This aspect significantly expands the range of industrial thermoplastics for obtaining composites with specified performance parameters.

The proposed principle of energy and technological compliance is implemented both in composites based on primary polymers and regenerated ones, which makes it possible to expand the range of effective use of regenerated thermoplastics by creating full-fledged functional materials for mechanical engineering. The choice of the methodological principle for creating a nanocomposite material and a metal-polymer system of a specific functional purpose is determined by the features of the physical-chemical processes occurring at the interface "matrix - modifier" and "composite - counterbody", which depend on the structural features of the matrix polymer, the conditions for combining components and operating metal-polymer systems.

The novelty of the developed nanocomposites based on industrial thermoplastics is confirmed by several Belarus patents for inventions. The developed compositions of nanocomposite materials based on polyamides, polyolefins, and fluoroplastics are used in mechanical engineering to provide the required resource of structural elements of machines, mechanisms, and technological equipment.

Biography

Victor A. GOLDADE, born: September 19, 1947.

EDUCATION:

- Engineer-physicist, Leningrad Polytechnic Institute, 1971
- PhD (Tech), Riga, Latvia, 1980
- Dr. Sci.(Tech), Riga, Latvia, 1989
- Full Professor in Physics, Minsk, Belarus, 1998.

PROFESSIONAL BACKGROUND

Main appointments:

- Scientific Researcher, Head of Laboratory, Principal Researcher in Metal-Polymer Research Institute of NAS of Belarus (MPRI), Gomel, 1972-
- Professor of Radiophysics and Electronics Department, Francisk Skorina Gomel State University, Gomel, 2011-
- Visiting positions:
- Visiting researcher, Institute of Physics, University Potsdam, Germany, 1995, 1997
- Visiting researcher, Electroacoustic Institute, Technical University Darmstadt, Germany, 2001

MEMBERSHIP OF SCIENTIFIC SOCIETIES:

- Member of International Eurasian Academy of Science, 1999-
- Member of Research Board of Advisors, American Biographical Institute, 2001-
- Member of Belarusian Engineering Academy, 2004-

RESEARCH AREAS:

- Polymer Physics,
- Polymer composite materials,
- Smart materials and structures.

PUBLICATIONS

- 410 scientific publications including: 22 monographs, 14 textbooks;
- 236 patents of USSR, Russia, Belarus, USA, UK, Germany, Italy and others.

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September 14, 2023

Effect of Ga doping on optical transmittance and electrical conductivity of CdS thin films

G. Sungi, M. E. Samiji, N. R. Mlyuka and **E. T. Shana**

Department of Physics, University of Dar es Salaam, Tanzania

This study aimed to investigate the effect of Ga concentration on optical and electrical conductivity of CdS thin films. Ga doped CdS thin films were deposited on Soda Lime Glass substrates by chemical bath deposition method while concentrations of Gallium was varied during doping. X-ray Diffraction (XRD), Raman spectroscopy, Scanning Electron Microscopy (SEM), Atomic Force Microscope (AFM), UV/VIS/NIR Lambda 9/19 double beam Spectrophotometer and Hall Effect Measurements system were used to analyse structural, surface morphology, optical and electrical properties of the films. XRD analysis revealed that deposited Ga doped CdS thin films had polycrystalline hexagonal phase, with preferred orientation along the (002) planes. An increase in Raman spectral intensity was observed for the doped films as compared to undoped CdS films. AFM and SEM analysis showed that grains were uniformly distributed on the substrate and were spherical in shape. The grain size and roughness increased with an increase in doping concentration as featured in the AFM and SEM images. Ga doping showed a strong effect to increase the transmittance of the films, with a maximum average transmittance of about 76% for film doped with 0.002 M of Ga concentration. Optical band gap for both undoped and doped films was in the range of 2.28 eV–2.44 eV. Electrical resistivity of the films decreased with an increase in dopant concentration, however beyond 0.002 M the resistivity increased. Ga doping improved the optical transmittance by 8.5% and electrical resistivity was decreased by 7%. Doping of CdS with Ga improved both optical and electrical properties of CdS thin films indicating potential application for window layer in thin film solar cells.

Biography

Gilya Sungi is currently a PhD student at the University of Dar es Salaam. He began doing research in the field of material Science since 2015 when was doing his undergraduate studies. He then employed by the University of Dar es Salaam in the Physics Department as tutorial assistant where he continued with research in the same field. His research focus has been on materials for solar cell applications and smart windows. Mr. Sungi has published articles on international journals, attended and presented research findings at international conferences and participated in writing books on engineering mechanics for secondary schools in Tanzania.

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Electrophysical properties of polycrystalline silicon with two structures obtained by bonding silicon particles with sunlight

Olimov Lutfiddin Omanovich
Andijan Machine-Building institute, Uzbekistan

It is known that the physical properties of polycrystalline silicon based semiconductor devices or solar cells under certain conditions are explained by its microstructure and intergranular boundary areas (e.g. [1-10], see also references given there). Studies have shown the potential for the production of relatively inexpensive and radiation-resistant solar cells or semiconductor devices as well as thermoelectric materials by controlling polycrystalline silicon dimensional defects and introductory conditions in the intergranular boundary areas field and charge transfer processes [1-7]. For example, it has been found that the introduction of additional alkali metal atoms in the intergranular boundary areas field changes the conductivity [4, 5], improves the conductivity, adsorption or dissociation of the input atoms eliminates the recombination centers in the n-layer and improves the diode characteristics of the p-n structure [6, 7]. These processes depend on the granule size or intergranular boundary areas field microstructure and are important in obtaining p-n structures based on polycrystalline silicon.

The article first describes the results obtained in the study of the electrophysical and charge transfer processes of two structural polycrystalline silicon obtained by bonding silicon particles with sunlight. The results of the study show that the charge transfer processes in such structures are found to be different from each other. In particular, at T~300-800 K, a decrease in the surface area of both structures μ was observed, and the temperature dependence of ρ and n differed from each other. For example, (a) in the surface area T~300-350 K and T~600-710 K ρ increases and n decreases, at T~350-550 K ρ decreases and n increases. Conversely, the surface area of the sample (b) is characterized by an increase in ρ and a decrease in n at T≤575 K, a decrease in ρ in the later stages of temperature increase, and an increase in n.

Abstract should give clear indication of the objectives, scope, results, methods used, and conclusion of your work. One figure and one table can be included in your results and discussions.

Biography

Olimov Lutfiddin Omanovich – Doctor of Sciences Physical and Mathematical, Professor of the Department "Material Science and Technology of New Materials", Andijan Machine-Building Institute, Andijan, Uzbekistan. Date of Birth - 12.07.1966

Area of scientific interests - semiconductor physics and materials science, micro- and nanoscale semiconductors, impurity thermos voltaic and impurity thermos voltaic effects, thermoelectric materials, alternative energy sources, physical bases of coatings.

Published over 200 scientific papers, including 1 monography, 10 textbooks and patents. The main scientific works:

Experience in management and implementation of research projects in the last 3 years:

Project managed BF3-003. Head of the fundamental project "Creation of non-conventional and alternative energy sources with semiconductor based micro and nano-based semiconductor based on the impurity voltage effect" 2017-2021;

Local coordinator of Erasmus + 586292-EPP-1-2017-1-PL-EPPKA2-CBHE-JP international project "Intelligent transport systems: New ict – based master's curricula for Uzbekistan" (INTRAS) – 2017-2020;

Project managed № UZB-Ind-2021-92. Head of the international project "Development and implementation of micro- and nanoscale (granulated) semiconductor thermoelectric materials" 2021-2023.

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Bifunctional bicarbazole-benzophenone based twisted donor-acceptor-donor derivatives for deep-blue and green OLEDs

S. Grigalevičius
Department of Polymer Chemistry and Technology, Kaunas University of Technology, Lithuania

Organic light-emitting diodes (OLEDs) have played a vital role in showing tremendous technological advancements for a better lifestyle, due to their display and lighting technologies in smartphones, tablets, television, and automotive. Undoubtedly, OLED is the mainstream technology and inspired by its advancements, there are presented bicarbazole-benzophenone-based twisted donor-acceptor-donor (D-A-D) derivatives as bifunctional materials. These materials possess high decomposition temperatures (>360°C) and glass transition temperatures (~125°C), high photoluminescence quantum yield (>60%), wide 20 bandgap (>3.2 eV), and short decay time. Owing to their properties, the materials were utilized as blue emitters as well as host materials for deep-blue and green OLEDs, respectively. In terms of the blue OLEDs, an emitter based device has outperformed others by showing a maximum efficiency of 4.0%, which is close to the theoretical limit of fluorescent materials for a deep-blue emission. Whilst the same material also displayed a maximum power efficacy of 45 lm/W as a host material doped with a phosphorescent emitter Ir(ppy)3. Furthermore, the materials were also utilized as hosts with TADF green emitter and the best device displayed a maximum efficiency of 11%, which may be attributed to the high quantum yield (69%) of the host. Therefore, the bi-functional materials which are easily synthesized, economical and possess excellent characteristics are expected to be useful in a variety of cost effective and high-performance OLED applications, especially in displays.

Biography

He was born in 1972 in Lithuania. He received his B.S. degree in Chemical engineering, M.S. degree in Polymer chemistry, Ph.D. degree in Chemistry, and a Habilitation in chemistry from Kaunas University of Technology, Kaunas, Lithuania, in June 1994, June 1996, December 2000, and October 2007, respectively. From 2007 to 2008, he served as a Senior Researcher and an Associate Professor at Kaunas University of Technology. From 2008 to 2010, he worked as a Leading Researcher and an Associate Professor at Kaunas University of Technology. Since 2010, he has been working as a Professor and a Leading Researcher at the Faculty of Chemical Technology, Kaunas University of Technology.

A Convolutional and Attention Based Capsule Network for SAR Image change detection

S. ATTIOUI and **S. NAJAH**
Intelligent Systems and Application Laboratory (LSIA), University Sidi Mohamed Ben, Morocco

SAR image change detection has garnered significant attention from the remote sensing community. The goal is to identify and quantify any changes that have occurred between the two images. Despite the growing interest and efficiency of change detection using SAR images, it remains a challenging and persistent topic. SAR images are typically more difficult for human operators to interpret compared to optical images due to their limited ability to distinguish details. This often results in time-consuming and costly interpretation of SAR images. Furthermore, SAR imagery inherently contains geometric distortions, and the appearance of targets is highly influenced by the relative orientation between the sensor and the target. Additionally, speckle noise present in SAR images can disrupt its processing and significantly impede the interpretation of its results. Despite the challenges in interpreting SAR images, ongoing efforts are being made towards developing automatic recognition techniques. The rise of deep learning (DL) techniques has led to significant advancements in solving the synthetic aperture radar (SAR) image change detection problem. However, achieving high efficiency and accuracy in the presence of speckle noise and limited labeled training data poses significant challenges.

The main contributions of our work can be summarized as follows:

1. We introduced a Multidimensional Parallel Capsule Network that not only extracts robust features but also models their hierarchical relationships, leading to optimal results with fewer training samples.
2. To address the issue of imbalanced samples during network optimization, we utilized a margin-focal loss function, which increases the focus on misclassified samples.
3. Our architecture includes an attention module designed to mitigate the interference of speckle noise. This module converts pixel intensities into the activities of local features, which are then fed as inputs to the primary capsule layer. By providing

better attention to the pixels, the module extracts the most relevant features with high-level semantic information, while removing noisy and distracting information.

By combining these techniques, we were able to achieve improved performance compared to existing approaches, even with limited training samples. Our work has the potential to improve our ability to monitor and understand changes in the Earth's surface, with applications in environmental monitoring, disaster management, and more.

Biography

She is currently in the final phase of her doctoral studies in a Computer Science doctoral program at the Laboratory of Intelligent Systems and Applications in the Faculty of Science and Technology at Fez. Her research interests include interdisciplinary investigations of (deep) machine learning and image processing, with a specific emphasis on remote sensing applications such as change detection and classification.

About optimal ways of sustainable development - contrary to pandemics, wars, natural calamities and climate changes

E. Agarwal, M. Bologa and **I. Bosneaga**
Institute of Applied Physics of Moldova State University, Republic of Moldova

We propose optimization of the Strategy of Sustainable Development, based on thermodynamic approach (because energy governs the world - our development is governed by energy transformations). As it comes from the thermodynamic analysis, the main parameter for optimization should be the increment (gain) of free energy ΔG (Gibbs's energy). We sustain that this gain of free energy ΔG is a universal integral parameter which finally characterizes the result of any processes and activities, inclusively can serve as a numerical criterion of optimization, sustainability, etc.

We prove that this approach ensures a breakthrough in Econophysics, contributing to its transformation into exact science. The possibilities of global extensive development are almost exhausted. Respectively, imperative (mandatory) intensive development imposes development of science (especially of applied science), elaboration and implementation of cutting-edge technologies (of carbon-neutral energy generation, nanotechnologies and nanomaterials, AI, etc.).

We analyze and substantiate some optimal (in our opinion) solutions, based on the proposed method of optimization – for low carbon-footprint energy supply, green buildings, combatting pandemics, etc.

Biography

Elena Agarwal graduated from the Université Louis-Pasteur (presently Université de Strasbourg, France) with a master's in pharmacology. She has worked in the molecular biology field at the National University of Ireland and the Purdue University Center for Cancer Research (West Lafayette, Indiana, USA). Elena has since advanced biofuels research by participating in one of the biggest corporate-academia collaborations between British Petroleum, Lawrence Berkeley National Labs and UC Berkeley. The latest works refer to the optimal technologies of pandemic COVID19 combatting.

Using a machine learning model to classify myographic diseases

N.T. Abdullayev[1] and **K.Sh. Oghuz**[2]
[1]*Azerbaijan Technical University, Azerbaijan*
[2]*Baku Higher Oil School, Azerbaijan*

Electromyography is a method for studying and evaluating the functional state of peripheral nerves, spinal roots, and muscles. Solve the classification problem, we applied sequential machine learning models using deep learning methods. The Keras Python library allows you to quickly and easily create deep learning models. The sequential API allows you to create layer-by-layer models for most tasks.

Electromyographic signals of a healthy patient and three common diseases were selected for the experiment. The total number of signals selected for the experiment was 24,000, and the EMG signals were numbered respectively as 0 - healthy, 1 - carpal tunnel syndrome, 2 - cubital tunnel syndrome, 3 - polyneuropathy.

When programming, all data divided into two parts, the first of them made up 70% of the entire database and they are selected as input, 30% of the total part is selected as the testing base. The accuracy of the neural network, which depends on the number of epochs, is established using the curves of accuracy and training losses, and the influence of the number of losses on improving the accuracy of the network is estimated.

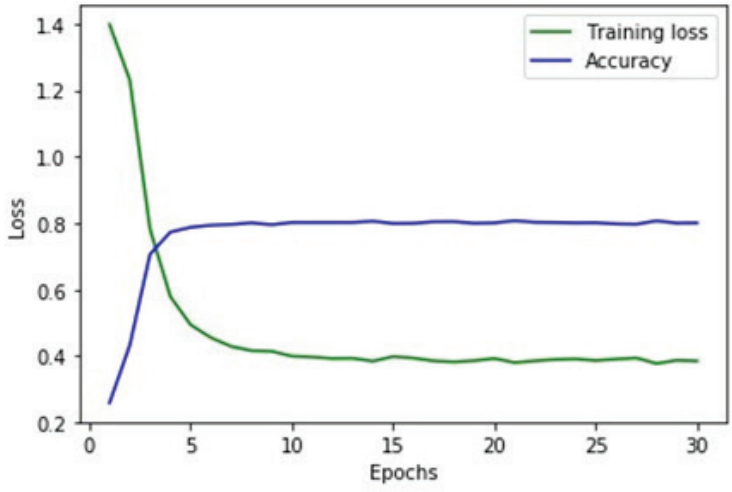

Fig. *The result of the relationship between the learning loss curve and the accuracy curve*

From Figure of the Accuracy and Training Loss Curves, it can be seen that the loss continues to decrease even though it intersects with the Accuracy Improvement Curve after 5 epochs. But after 25-30 epochs these curves stabilize, and this shows a respectable number of epochs. With this information, we can reduce the training time, which is important not only to save time, but also to save machine memory. Using this method, a particularly good result was obtained for the classification of myographic diseases, as the prediction results are accurate by 82%.

Biography

Namig Abdullayev - doctor of technical sciences, author of more than 200 scientific papers. Scientific interests of the system for processing electrophysiological signals for diagnosing the functional state of the organs of the human body.

Kamala Oghuz – Ph.D., Associate Professor, author of more than 60 scientific papers. Scientific interests are increasing the accuracy in the diagnosis of muscle diseases by various methods and means, introducing new informative parameters, also, use of the multifactorial analysis, the chaos theory methods for diseases predicting.

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Hydrogen storage in porous ceramic materials of aluminosilicate composition

M. Payzullakhanov and **O. Parpiev**
Material Sciences Institute, Academy of Sciences of the Republic of Uzbekistan, Uzbekistan

The problem of an adverse effect of human activity on the environment resolves into devising a strategy for development of the economy that relies on renewable sources. In this plan, the center stage is taken by so-called "green hydrogen" based on water electrolysis (splitting water into hydrogen and oxygen) using green electricity, that is, from renewable energy sources, such as, solar energy. Solar energy is considered the most promising source for the unconventional (alternative) energy industry in the conditions of climate change and trend for decarbonization of the global economy, including the transportation and energy industry. The growth rate of the development of the energy industry is hindered by unresolved challenges of hydrogen storage and delivery. Storage of gaseous hydrogen in cylinders of special materials withstanding high pressure (300–700 atm) poses a hazard, while hydrogen storage in a liquid state in special reservoirs (cryostats) under temperatures below –253ºC is costly. Hydrogen can also be stored in chemically bound state in metals by means of hydrogenation. Of the sought solutions, hydrogen storage by adsorption (physisorption) on light-weight porous materials is the primary research focus. The problem with the majority of adsorbents is that energy of interaction between a solid and gas is too low to retain the desired amount of gas (at least 7 mass %) at ambient temperature. Importantly, if the energy interaction is too high, the efficiency will suffer likewise, since a large amount of hydrogen will be retained by an adsorbent at discharge (pressure charging). Due to their high density, zeolites seem unlikely candidates for on-board storage and delivery of hydrogen. A well-understood crystalline structure and simple ion exchange, however, make zeolites an ideal material for hydrogen adsorbers. These materials can also perform as catalysts, enhancing water splitting, when heated by a concentrated solar stream. Hydrogen storage systems are characterized by aspect ratio which is a ratio of masses of absorbed hydrogen to mass of absorber. When H2 is stored at pressures up to 30–40 MPa, α = 8–10 for cylinders; α ≤ 2–3 for metal hydrides. At

10–15 MPa, α = 10–15 for super-cylinders of composite nanomaterials. The majority of the materials allow absorption of not more than 7 or 8 mass % of hydrogen. The use of porous ceramics as absorbers based on physical sorption of hydrogen in the pores by van der Waals forces appears to be one of the safest methods of hydrogen storage. For porous ceramics, the aspect ratio is defined by composition, porosity, as well as grain size of the ceramic material of the absorber. Thus, glass–ceramic materials (CuMnO2) allow hydrogen absorption in the amount of 16g H2/kg and approximately 50g H2/kg at 473 and 573K, respectively, under a pressure of 20atm.

Biography

Dr. Muhammad-Sultanhan Payzullakhanov has completed in the 1984 at the age of 25 years from Uzbek National University and postdoctoral studies from Nuclear Physics Institute of the Uzbekistan academy of sciences and defended PhD thesis on the effects of radiation on the structure and properties of superconducting ceramics in the 1998. The field of scientific interests is material sciences, solar energy use. He is the head of the ceramic's laboratory of the Material-sciences institute of the scientific production association "Physics-Sun". He has published more than 45 papers in reputed journals and has been serving as an editorial board member of repute.

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Characterization and quality evaluation of cement raw materials and their possible substitutes in Yemen

Ahmed Mohammed Al-Anweh[1], Mohamed Mahmoud Abu-Zeid[2], Mohammed Ibrahim El-Anbaawy[3] and **Ibrahim Abdulhamid Al-Akhaly[4]**

[1]Faculty of Sciences and Literatures, Amran University and Amran Cement Factor, Yemen
[2]Geology Department, Ain Shams University, Egypt
[3]Geology Department, Cairo University, Egypt
[4]Department of Earth Sciences, Sana'a University, Yemen

Combined geologic, lithologic, petrographic, mineral, and chemical investigations were conducted on the natural cement raw materials that are presently used by the six main cement plants in Yemen. The results of investigations were implemented to precisely characterize those materials. This permitted the determination of the relative suitability of the carbonates exploited from the various quarries to produce Portland cement either as natural cement rocks or by using correctives to modify their composition. This study involved also the determination of the types and composition of the correctives that can produce cements with highest quality. Moreover, an attempt has been made to assess the available natural substitutes for the presently used correctives and additives. This is most importance to deal with the progressive decrease in their reserves and to avoid getting the sand and clay raw materials by excavating the valuable agricultural and reclaimed lands.

Biography

Birthday: 20 May 1981

Nationality: Yemeni

Assistant Professor of Geology at Amran University

Ph.D. Geology and Industrial Applications (Ain Shams University-Egypt). Title thesis "Geology Characteristics and Industrial Application of Raw Materials for Cement Production in the Republic of Yemen".

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Bio- synthesis of metal nanoparticles using plant leaf extract and their potential applications

Parvathalu Kalakonda[1], K. Rajitha[1], K. Harikrishna[1], S.Ramu Naidu[2], Merlin sheeba G L[3], Banavoth Murali[2] and **Vijay Morampudi[3]**

[1]Department of physics, Government City College (A), India
[2]Department of Chemistry, University of Hyderabad, India
[3]Department of Chemistry, University of Hyderabad, India

The metal nanoparticles have been recognized as an excellent antibacterial agent, having the potential to fight against different pathogenic microorganism. The global demand for a more green and sustainable economy has influenced on several material industries, including nanomaterial's and nanotechnology. Green synthesis has become a new area of research to produce large quantity of nanomaterial's that are reliable, sustainable, biological safe, eco-friendly, and cost effective methods. We use the ultraviolet-Vis spectroscopy, Fourier transformed infrared spectroscopy, X-Ray diffraction, scanning electron microscopy to confirm the formation of nanomaterial's, and characterize their material properties. The minimum inhibitory concentration and dis diffusion assay to show antibacterial effect on various pathogenic microorganisms. Our work presents a potential path to produce non-toxic metal nanoparticles with enhanced antibacterial activity, which can meet the increasing global demand of biogenic nanoparticles as an alternative to antibiotics.

Biography

Dr. Parvathalu Kalakonda has been working as Assistant Professor in the Department of Physics, at Government City College Autonomous, Hyderabad, India. His current research explores on green synthesis of nanoparticles for biomedical applications. He also works carbon based aerogel scaffolds for thermoelectric applications. Before joining in this institute, he was working as a post-doctoral fellow at the department of material science Engineering Carnegie Mellon University, PA, USA. He also worked research faculty at King Abdulla University of Science and Technology, KSA. He completed his PhD in Physics from Worcester polytechnic Institute, MA, USA in the area of thermal physical properties of Nano composites of Complex Fluids. He is an Assistant Editor of Material Chemistry and Physics Journal in Wiley publisher. He has been working as reviewer for more than 10 journals such as Material science, Nanomaterial's and Nanotechnology, Materials and results, Materials proceedings, Polymer Journal, Material Letter, Plasmonics etc. He published more than 30 international peer reviewed journals including RSC Advances, Nano-scale Advances, Nanotechnology and Nanomaterials, Journal of Chemical Physics, Journal of Plasmonics etc. which are highly cited in the scientific community.

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Suppression limit cycles in 2x2 nonlinear systems with memory type nonlinearities

K. C. Patra
C. V. Raman Global University, India

In today's scenario, nonlinear self-sustaining oscillations otherwise called as limit cycles are one of the most important entity that limits the performance of most of the physical systems in the world. It is a formidable task to suppress the limit cycles for 2x2 systems with memory type nonlinearity in particular. Backlash is one of the nonlinearities commonly occurring in physical systems that limit the performance of speed and position control in robotics, automation industry and other occasions [1, 2]. The feasibility of suppression of such nonlinear self-oscillations has been explored by using pole placement technique. The novelty of the work lies with the investigation in case of the memory type non-linearity like backlash especially which is an inherent Characteristic of a Governor used for usual load frequency control of an inter-connected power system and elsewhere. Suppression of Limit Cycle using pole placement is adopted either arbitrary or optimal selection using Riccati Equation through State Feed Back. The Governing equation is d/dt [X(t)]=(A-BK)X: which facilitates the determination of feedback gain matrix K for closed loop Poles/Eigen values placement where the limit cycles are suppressed/eliminated in the general multivariable systems. The analysis is based on harmonic linearization using graphical method which has been substantiated by digital simulation / use of SIMULINK Tool Box and the same have been illustrated through example.

The Poles / Eigen values are determined for Limit Cycling Systems with Memory type nonlinearities whose describing functions (harmonic linearization) are complex functions of X and ω. Hence, it is felt necessary to develop a graphical technique using harmonic balance method. The poles of such systems are placed suitably so that the systems do not exhibit limit cycles.

There is ample scope of extension of the present work for prediction of limit cycles and it's suppression in 3 X 3 or higher dimensional systems.

Example 1 - Consider a system as shown in Fig.1 where N1 and N2 are two nonlinear elements with backlash type input-output characteristics. G1, G2 are the transfer functions of the linear elements. Backlash nonlinearities contribute additional phase angle to the loop phase angles of G1 (j ω) and G2 (j ω) of the subsystems (s1) and (s2).

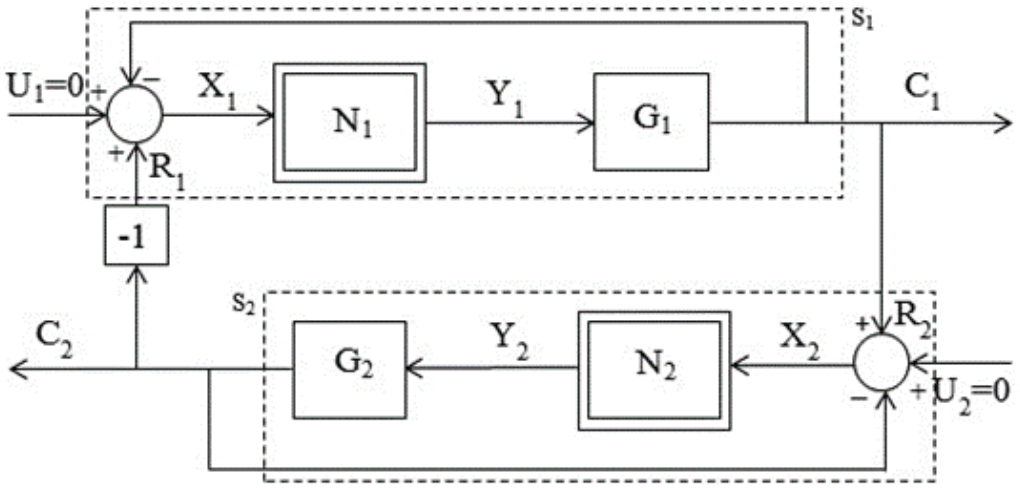
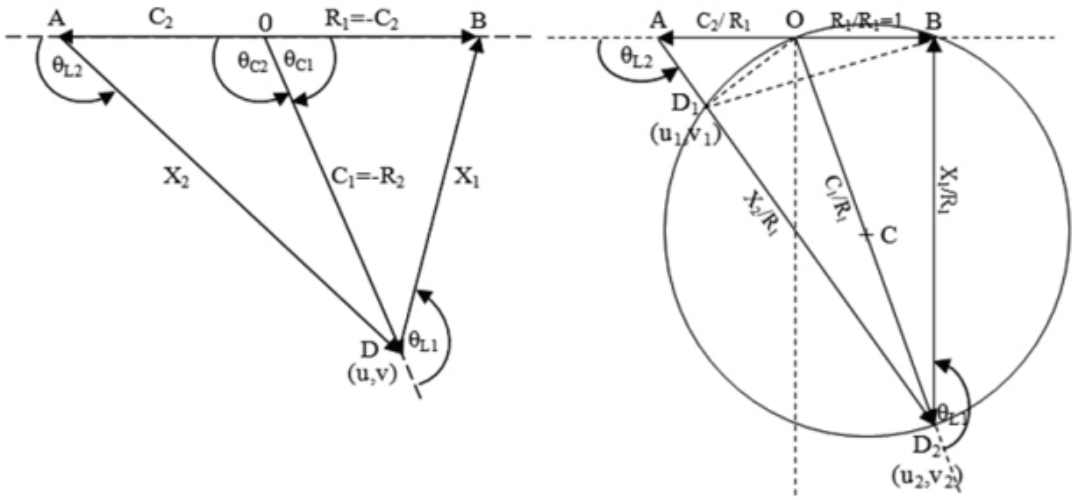


Figure 1- *Sample System*

The graphical method developed in the present work has been illustrated through the Fig. 2 for the example 1. The results are shown partially in Table 1a. Under autonomous state, the system exhibits limit cycles (c.f. Table 1a). Suppression of Limit Cycle (LC) using pole placement is adopted either arbitrary or optimal selection using Riccati Equation through State Feed Back which has been depicted in Table 1b.



(a) *(b)*

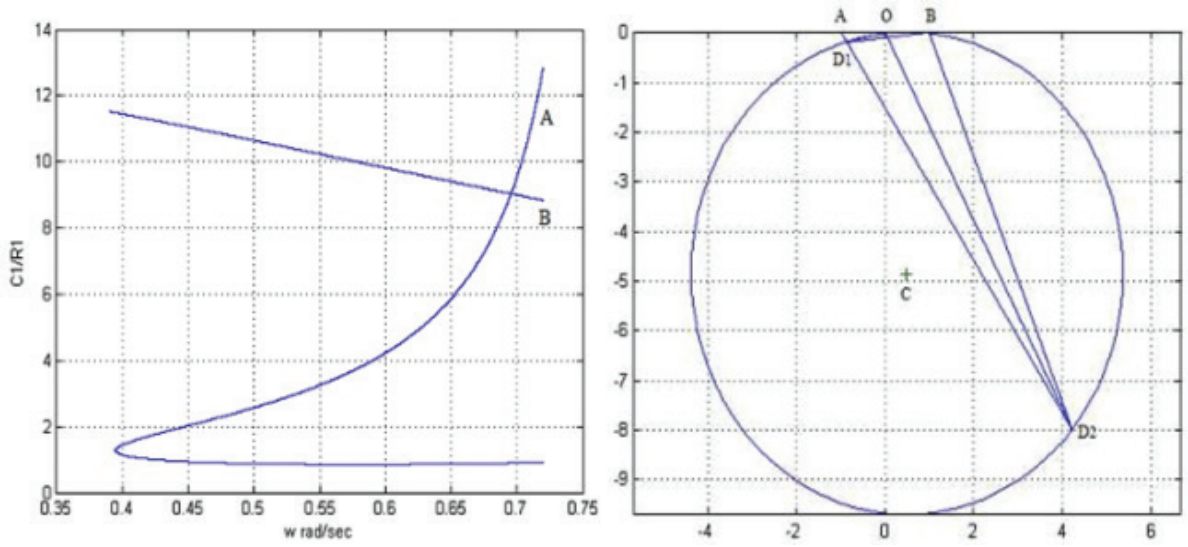


Figure 2-(a) *Phase diagram for a 2 × 2 nonlinear system,*
(b) *normalised phase diagram for a simplified generalised 2×2 nonlinear system,*
(c) *solution of the system,*
(d) *normalised phase diagram for Example 1 (backlash) with ω= 0.6955 radian/sec*

Table 1a: *Values of different quantities for example 1 for backlash: with D1 =2.16, D2 =1.26, b1=b2=1.0; Xm1=2.3 and Xm2=1.4*

Ω	θ_{L1}	θ_{L2}	R (Radius)	$\frac{C_1}{R_1}$ Plot (c f Table 2)	$\frac{C_1}{R_1}$ Eq. (17)
0.600	-166.3730	-121.8119	0.508	0.8554,4.2227	9.8200
0.625	-168.6673	-122.1618	0.505	0.8616,4.9186	9.6127
0.650	-170.5142	-122.5110	0.503	0.8720,5.8676	9.4065
0.675	-172.5052	-122.8596	0.501	0.8869,7.2609	9.2017
0.700	-174.4505	-123.2074	0.500	0.9064,9.5447	8.9988
0.6961	-174.1500	-123.1532	0.500	0.9031,9.0955	9.0303
0.6955	*-174.1037*	*-123.1448*	*0.551*	*0.9025,9.0302*	*9.0351* ***(LC)***
0.72	-177.5066	-125.816	0.638	0.9084,11.500	11.87

Table 1b: *Poles/Eigen values of the system in the presence and absence of limit cycles for example.1*

System Condition	Roots	State feedback constants
Limit cycle exhibits	$\lambda = -1.917 \pm j0.2406$	$k_1 = 0, k_2 = 0$
Limit cycle does not exist (Optimal selection of gain K)	$\lambda = -1.201 \pm j0.2833$	$k_1 - 0.0192,$ $k_2 = 0.0187$

Biography

Dr. K.C. Patra received B.Sc. Eng. (Hons) Degree in Electrical Engineering from REC (now NIT) Rourkela 1971, M. Sc, Eng. from Sbp, unv. in 1976 and Ph.D. Degree in Engineering from IIT Kharagpur, India in 1986. He has been working as a Professor in Electrical Engineering since 1989 to 2007 at IGIT, Sarang, Odisha, India, presently at C. V. Raman Global University, Bhubaneswar Odisha, India; he has published 117 research papers in Journals and Conferences. He has authored one book in Control System Engineering. He has bagged 23 National and State Level Awards for his research work. Guided research scholars towards Ph. D degrees in: Analysis of Signal Stabilization of multivariable nonlinear control systems, Analysis of switching boost converters, Optimal design of electrical equipments and their application in Industrial Sectors leading to energy conservation, Investigation of Limit Cycles and signal stabilization of two dimensional systems with memory type nonlinear elements

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Substrate induced strain, growth condition and oxygen vacancy dependent magnetotransport studies in manganite thin films

M. K. Srivastava[1], V. Agarwal[2], Amarjeet Kaur[3] and **H. K. Singh[4]**

[1]Department of Physics, D.A.V.P.G. College, D.D.U. Gorakhpur University, India

[2]Department of Physics, Maitreyi College, University of Delhi, India

[3]Department of Physics & Astrophysics, University of Delhi, India

[4]CSIR- National Physical Laboratory, India

Ultrasonic nebulized spray pyrolysis technique was used to deposite polycrystalline $Sm_{0.55}Sr_{0.45}MnO_3$ (SSMO) manganite thin films (thickness ~100 nm) grown on different substrates viz. LAO, LSAT and STO substrate in different ambience (annealed in air, oxygen and air-quenched) and impact of substrate induced strain, growth condition and oxygen vacancy were investigated on magnetic and magnetotransport properties. The X-ray diffraction θ–2θ scan confirms that these films (i) have very good crystallinity, (ii) highly oriented along out-of-plane c-direction, and (iii) the films on LAO are under compressive strain while small tensile strain are produced by STO and LSAT substrates. The air annealed SSMO films on LAO show large enhancement in paramagnetic insulator (PMI) to ferromagnetic metal (FMM) transition temperature, i.e., T_C/T_{IM} ~165 K corresponding to their bulk value ~ 130 K, which decreases to 130 K and 120 K in LSAT and STO films respectively. The films on LAO and STO show peak CMR around T_C/T_{IM}, while the film on LSAT shows MR > 99 % over a very wide temperature range of ~40 K centred on T_C/T_{IM}. The impact of oxygen vacancy results into (i) higher value of T_C/T_{IM}, (ii) sharper PMI-FMM transition, as confirmed by higher temperature coefficient of resistance (TCR), (iii) higher value of magnetization and magnetic saturation moment, and (iv) higher value of magnetoresistance. The magnetic state at $T<T_C$ is akin to cluster glass, which is formed by the presence of charge ordered-antiferromagnetic clusters in the ferromagnetic matrix. We suggest here that oxygen vacancy favors ferromagnetic metal phase while oxygen vacancy annihilation leads to antiferromagnetic-charge ordered insulator phase. The experimental results have been interpreted in terms of differences in the dimensionality and fraction of the competing ferromagnetic metal and antiferromagnetic-charge ordered insulator phases caused by the growing conditions.

Biography

Dr. Manoj Kumar Srivastava is a Material Science researcher who is working on the bulk and thin film counterparts of oxide materials viz. manganites and multiferroic. He did his Ph.D. on low bandwidth manganite thin films from University of Delhi and CSIR-National Physical Laboratory, New Delhi, INDIA. He has served as an assistant professor of Physics, Deshbandhu College, University of Delhi, New Delhi. He currently serves as the Head of the Physics Department, D.A.V. Post Graduate College, DDU Gorakhpur University, Gorakhpur, Uttar Pradesh, INDIA.

He has published 16 research papers in international journals of repute and authored 3 books of Physics at under graduate level. He has presented his research work in many national and international conferences. He has also delivered his talk as an invited speaker in Seoul National University, South Korea.

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Synthesis of hierarchical micro-mesoporous ZSM-5 zeolite and its catalytic activity in benzylation of mesitylene

Manikandan Krishnamurthy[1] and **Valarmathi Narayanan**[2]
[1]*Kalasalingam Academy of Research and Education, Nano Materials Research Laboratory, India*
[2]*Department of Chemistry Vellore, Vellore Institute of Technology, India*

The hierarchical micro-mesoporous ZSM-5 (MFI type) zeolites were synthesized by using corn plant stem pith powder from agricultural waste as hard template under simple hydrothermal method. The additional porosity could be generated after adding the pith powder into the zeolites precursor gel yielded hierarchical micro-mesoporous ZSM-5 zeolite (C-ZSM-5). Conventional micro porous ZSM-5 (ConvZSM-5) was also obtained by same methods without adding the hard templates to compare the catalytic performances. The prepared C-ZSM-5 zeolite exhibited 89% conversion, much greater than ConvZSM-5 (33%). Importantly, the selectivity in the formation of 2-Benzyl-1, 3, 5-trimethylbenzene, by benzylation with C-ZSM-5 (70%) is more than two times than ConvZSM-5 (32%). This benzylation reaction could be used as a test reaction to evidence the formation of hierarchical micro-mesoporous nature of the material confirmed by BET which was shown in Figure.1. C-ZSM-5 exhibited better selectivity and benzyl alcohol conversion due to the presence of hierarchical pores and strong acidy in C-ZSM-5. The product formed in the above reaction was separated and further confirmed by 1HNMR and 13CNMR. Even after consecutive recycles every month for three months, the conversion and desired products selectivity had not been affected. The hierarchical pores present in the catalyst further improved the stability of the zeolites. Hence this catalyst could be very useful for industrially important reactions. Textural properties of prepared zeolite shown in Table.1

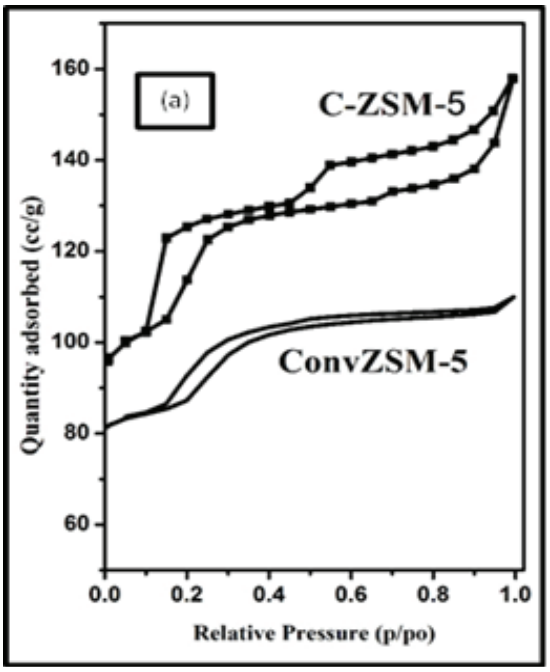

Fig. 1. *Nitrogen adsorption isotherms of the ZSM-5 zeolite*

Catalyst	Total surface area (m^2/g)	External surface area (m^2/g)	Micropore Surface area (m^2/g)	Micropore Volume	Total pore volume(cc/g)	Si/Al ratio
C-ZSM-5	385	207	176	0.08	0.20	25
ConvZSM-5	330	68	262	0.10	0.16	25

Table.1 *Textural properties of prepared zeolite*

Biography

At present Dr. Manikandan Krishnamurthy, working as Postdoctoral Research Fellow in Kalasalingam Academy of Research and Education (KLU), India. He was born in Tamil Nadu on 11 June 1988. He had his early schooling in Tamil Nadu. He obtained a B.Sc. degree (Chemistry) from the Muthurangam Government Arts College in 2010 and M.Sc. (Chemistry) from Thiruvalluvar University in 2012. He completed his Ph.D in Materials Chemistry in 2018 at Vellore Institute of Technology (Formally known as VIT University). He has considerable teaching and research experiences. After completing his Ph.D he joined as Postdoctoral Research Fellow in Nanjing Tech University, Nanjing, China under prof. Fang and worked there for two years. He is also published more than 10 research articles in reputed national and international journals and also written few book chapters and presented his research work in national and international conferences and seminars and his main area of research interest is synthesis of hierarchical porous zeolites and its catalytic activity studies.

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Recent advances of nanostructures of metal oxides for hydrogen evolution

Nagaiah Kambhala

Department of Physics, Jain (Deemed to be) University, India

Hydrogen is one of the energy carriers with carbon-free and most people believe that hydrogen is the future energy source for many fields. Green hydrogen is one which can generate using electrocatalysis, in this process, the role of the electrocatalyst is crucial. The platinum group metals are used as standard electrocatalysts. However, the limitations of high cost and less availability of Pt are obstructing the wide-ranging of viable applications. Hence, significant research studies are happening for developing new electrocatalysts with earth-abundant materials (Pt-free materials) like Metal oxides, sulphides, phosphates and alloys, etc. and are cost-effective. Among these materials, metal oxides are getting interesting due to their compositional and structural diversity. However, these bulk metal oxides are inactive for hydrogen evolution reactions (HER) due to their poor conductivity and less active sites. The nanostructures of metal oxides are good in the HER due to the higher surface-to-volume ratio and the significant number of active sites on the surface. Here I am going to explain the various strategies for improving the electrocatalyst's properties, some of the recent advances and my recent works on the HER using metal oxides.

Biography

Dr. Nagaiah Kambhala is working as an Assistant Professor in the Department of Physics, School of Sciences, Jain (Deemed to be) University, Bangalore, India. After Ph.D., he has about seven years of research and teaching experience. He is a gold medalist from Sri Venkateswara University for M.Sc. Physics. He qualified for GATE-2010 and CSIR NET - Dec. 2009. He finished his Ph.D. from the Centre for Nano and Soft Matter Sciences (autonomous Institute under the Department of Science and Technology (DST), Govt. of India), Bangalore. During his Ph.D. time, he received the research fellowships of JRF, SRF and Travel fellowships from DST (Govt. of India) and several best presentation awards. He has done postdoctoral research from Centre for Nano and Soft Matter Sciences, Bangalore and Indian Institute of Technology, Madras. He has been selected for a National Postdoctoral fellowship from the SERB-DST (Govt. of India) in the Indian Institute of Science, Bangalore. He has guided about ten post-graduation projects thesis and now presently he is guiding seven post- graduation project students and three Ph.D. Scholars. He has published about 20 international publications and several conference presentations within India and abroad. He is working on the materials in the nanoscale for novel applications like energy, sensors and spintronics.

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Customer purchasing behavior prediction using machine learning classification techniques

Gyanendra Chaubey[1], Prathamesh Rajendra Gavhane[2], Dhananjay Bisen[3] and Siddhartha Kumar Arjaria[1]

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[2]Dr. D Y Patil School of Engineering and Technology, India
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Many sales and service-providing companies need to talk up related customers while launching the new products, services, and updated versions of existing products. While doing so, they need to target their existing customers. The behavior of these customers gives companies information about how to sell products. This paper presents a comparative study of different machine learning techniques that have been applied to the problem of customer purchasing behavior prediction. Experiments are done using supervised classification machine learning techniques like logistic regression, decision tree, k-nearest neighbors (KNN), Naïve Bayes, SVM, random forest, stochastic gradient descent (SGD), ANN, AdaBoost, XgBoost, and dummy classifer, as well as some hybrid algorithms that use stacking like SvmAda, RfAda, and KnnSgd. Models are evaluated using the cross-validation technique. Furthermore, the confusion matrix and ROC curve are used to calculate the accuracy of each model. Finally, the best classifer is a hybrid classifer using the ensemble stacking technique (KnnSgd), with an accuracy of 92.42%. KnnSgd gives the highest accuracy with maximum features because the error of the KNN and SGD are minimized by the KNN at the end.

Biography

Gyanendra Chaubey is currently working as Software Engineer in HCL Technologies Ltd. He has received his B.Tech degree in information technology from Rajkiya Engineering College, Banda, India. He has published 7 research papers in national and international journals/conferences. His areas of interest are machine learning, deep learning, data mining, and artificial intelligence.

Engineering at the nanoscale: A strategy for developing high performance functional materials from biopolymers

Sabu Thomas
Mahatma Gandhi University, India

Green chemistry started for the search of benign methods for the development of nanoparticles from nature and their use in the field of antibacterial, antioxidant, and antitumor applications. Bio wastes are eco-friendly starting materials to produce typical nanoparticles with well-defined chemical composition, size, and morphology. Cellulose, starch, chitin and chitosan are the most abundant biopolymers around the world. Cellulose nanoparticles (fibers, crystals and whiskers) can be extracted from agrowaste resources. Chitin is the second most abundant biopolymer after cellulose, it is a characteristic component of the cell walls of fungi, the exoskeletons of arthropods and nanoparticles of chitin (fibers, whiskers) can be extracted from shrimp and crab shells. Starch nano particles can be extracted from tapioca and potato wastes. These nanoparticles can be converted into smart and functional biomaterials by functionalization through chemical modifications due to presence of large amount of hydroxyl group on the surface. The preparation of these nanoparticles includes both series of chemical as well as mechanical treatments; crushing, grinding, alkali, bleaching and acid treatments. Since large quantities of bio wastes are produced annually, further utilization of cellulose, starch and chitins as functionalized materials is very much desired. The cellulose, starch and chitin nano particles are currently obtained as aqueous suspensions which are used as reinforcing additives for high performance environment-friendly biodegradable polymer materials. These nanocomposites are being used as biomedical composites for drug/gene delivery, nano scaffolds in tissue engineering and cosmetic orthodontics. The reinforcing effect of these nanoparticles results from the formation of a percolating network based on hydrogen bonding forces. The incorporation of these nano particles in several bio-based polymers have been discussed. The role of nano particle dispersion, distribution, interfacial adhesion and orientation on the properties of the ecofriendly bio nanocomposites have been carefully evaluated.

Biography

Sabu Thomas is currently the Vice-Chancellor of Mahatma Gandhi University, Kottayam, Kerala, India. He is a Professor at the International and Inter University Centre for Nanoscience and Nanotechnology and Full Professor of Polymer Science and Engineering at the School of Chemical Sciences of Mahatma Gandhi University, Kottayam, Kerala, India. His ground-breaking research has covered the areas of polymer science and engineering, polymer nanocomposites, elastomers, polymer blends, interpenetrating polymer networks, polymer membranes, green composites and nanocomposites, nanomedicine and green nanotechnology. Prof. Thomas has received several national and international awards in recognition for his work, and recently received Honoris Causa (DSc) from the University of South Brittany, Lorient, France, in recognition for his contributions to polymer science and engineering. Prof. Thomas has published over 1400 peer- reviewed research papers, reviews and book chapters. He has co-edited more than 183 books. Currently he is having an H index of 127.

Enhanced optimization techniques to face the latest data acquiring challenges with Artificial Intelligence

K. Raveendra and **Dr. C. Chandrasekhar**
Sri Venkateswara College of Engineering, India

Present global era of an eco-friendly digital environment, artificial Intelligence plays a vital role in analysing data in various forms like video, image, audio and text. The analysis of data can use various algorithms developed using machine learning concepts. Out of all the developing algorithms, the algorithms developed with optimization techniques which in turn increases the levels in computer programming are taking the lead due to their advantages and accuracy in the data analysis process. Optimization is nothing but reaching to the desired set of values or almost near to the desired set of values. The iterative mathematics, numerical methods and stochastic processes are the key concepts in understanding and analysing any optimization technique. In order to acquire the wanted data at a very fast rate with more accuracy, the concept of double optimization can be used as the current trend in all soft computing models to have their own advantages of improved classification accuracy and efficiency as well as limitations with respect to the various analysing parameters like memory, speed, efficiency, accuracy and final or overall performance of the desired machine learning algorithm developed. Even though there are different number of efficient optimization algorithms available, it is required to go with double optimization sometimes. Especially when we are dealing with a complex type of data analysis problems like big data analytics consisting of large video or picture frames. Finally, in order to increase the efficiency to the desired value of the complex problems with compromised limited speed in performance, the double optimization machine learning algorithms can be preferred to deal with present challenging high rate of data analytics to face the latest data acquiring challenges with Artificial Intelligence.

Biography

Dr. K.RAVEENDRA presently working as professor in Electronics and Communication Engineering department at Sri Venkateswara College of Engineering, Tirupati, Andhra Pradesh, India with total teaching experience of 22 years has completed his doctoral degree in Image Processing in June 2022 from KL (Deemed to be) University, Vijayawada, Andhra Pradesh, India. Completed his master's degree in Instrumentation and Control Systems from Jawaharlal Nehru Technological University, Kakinada, Andhra Pradesh, India and Bachelor's Degree in Electronics and Communication Engineering department at Sagi Rama Krishnam Raju (SRKR) Engineering College, Bhimavaram, Andhra Pradesh, India. Has published 3 Patents out of which one is Granted. Published 16 International and National Articles in reputed journals. Awarded 4 times as Best Researcher and as Mission10Xian by Wipro in High Impact Teaching Skills. Life member in ISTE, ISOI, and Member in IAAC, IMRTC Professional societies. Has Vidwan score of 8.5 out of 10-point scale index.

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Enhancing bone tissue engineering using iron nanoparticles and magnetic fields: A focus on cytomechanics and angiogenesis in the chicken egg chorioallantoic membrane model

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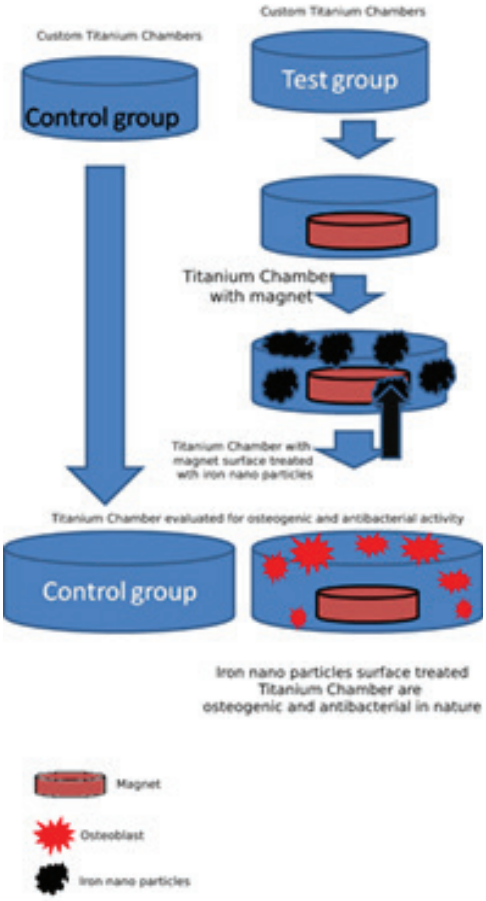
[2]Head of Department of Prosthodontics, KLEVK Institute of Dental Science, KLE Academy of Higher Education and Research, India
[3]Department of Prosthodontics, Raj Rajeshwari institute of dental science, India

Background: Bone tissue engineering has shown great potential in the treatment of bone defects and injuries. However, challenges remain in achieving adequate cell homing, osteogenic activity, and antimicrobial properties. Iron nanoparticles (FeNPs) have emerged as a promising tool in bone tissue engineering due to their ability to enhance cell homing and osteogenic activity. Additionally, magnetic fields (MFs) have been shown to influence cellular behavior. Therefore, this study aims to investigate the potential of FeNPs and MFs to improve the cytomechanics of osteoblast cells, with a focus on enhancing cell homing, neovascularization, and angiogenesis in bone tissue engineering.

Aim/Hypothesis: To evaluate the potential applications of FeNp for enhancing the cytomechanics of osteoblast cells for improved cell homing, osteogenic activity, and antibacterial properties in the presence of magnetic fields, as well as to investigate their angiogenic potential *in vivo* using the chicken egg chorioallantoic membrane (CAM) model under the influence of a magnetic field.

Methods and Materials: The custom-grade IV titanium (Ti) hollow chamber is created and surfaced with FeNp. The effect of FeNp on osteoblast-like cells (MG63) was examined in terms of cell attachment and survivability, morphological traits, particle absorption, and antibacterial activities. Cell viability was determined using MTT and matrix mineralization was determined using von Kossa histochemical staining. The mechanical properties of the cells were assessed using Fluorescent microscopy , and the expression of vinculin and talin and angiogenic potential *in vivo* using the chicken egg chorioallantoic membrane (CAM) model under the influence of a magnetic **Field.**



Results: Results demonstrate that the presence of FeNPs and exposure to MFs led to improvements in osteoblast cell mechanics, neovascularization, angiogenesis, osteogenic activity, and cell homing. Moreover, mineralization was significantly higher in the group with magnetized titanium chambers compared to the control groups ($p < 0.05$). FeNp-modified titanium chambers also displayed antibacterial properties against S. aureus (MIC: 0.03135 mg/mL) and E. coli (MIC: 0.02915 mg/mL) with a p-value of 0.027. Overall, our findings suggest that FeNPs and MFs have great potential for enhancing bone tissue engineering by improving cell functions and preventing bacterial infections.

Conclusion: FeNP, when combined with an external MF, have been shown to enhance neovascularization, angiogenesis, and osteogenesis by sensitizing cells and delivering biomechanical stimulation at the molecular level through the cytomechanics of osteoblast cells. A deeper understanding of these mechanical characteristics can aid in the development of effective bone tissue engineering techniques. Further research is needed to fully explore the role of cytomechanics in osteoblast cell behavior and to develop more targeted approaches for bone tissue engineering.

TABLE I : Percentages of proliferation rates in different time periods

CONTROL	24hrs	48hrs	72hrs
	46%	54%	57%
FeNp	104.4%	109.7%	107.4%

***Table II:** Unpaired t test alkaline phosphatase*

GROUP	MEAN± SD	MEAN DIFFERENCE	95% CI	T VALUE	*P* VALUE
CONTROL (*n*=15)	22.20±0.92	-0.80	-1.62 to 0.02	2.0580	0.054
TEST (*n*=15)	23±0.82				

*All the values are mentioned in Mean±SD; Test applied: Unpaired t test; Confidence interval; 95%; *p < 0.05: Statistically significant*

Biography

Dr Santosh nelogi has more than 12 yrs of experience in the field of dentistry and prosthodontics . He completed his MDS from SDM institute of dental science. He's interested in learning advancement in the specialty continued, Persuing PHD from KLE University. Fellow ship from Branamark osseointigration center Sweden in 2017. Seeing his excellence in Dental implantology, he was invited speaker at European association of osseointigration EAO 2018. Austria. 2020 Germany and in 2021 Italy. He is the ad hoc reviewer for many national and international journal He has co-authored two books. And having 2 patents on his name. He has published numerous articles in peer-reviewed national and international journal.

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A distributed key authentication and OKM-ANFIS scheme based breast cancer prediction system in the IOT environment

Savitha V[1], Karthikeyan N[1], Karthik S[2] and **Sabitha R[1]**

[1]Department of Computer Science & Engineering, SNS College of Technology, India

[2]Dean, Department of Computer Science &Engineering, SNS College of Technology, India

The Internet of Things (IoT) has significantly upgraded in medical and health care. This technology aids the patients as well as doctors for envisaging an assortment of diseases precisely and diagnoses these diseases as per the outcomes. However, the prevailing research methodologies encompass the issue of poor diagnostic accuracy in addition to safe data transfer betwixt IoT and cloud storage. This paper proposed a distributed key authentication in addition to OKM-ANFIS cantered breast cancer (BC) prediction system on the IoT environment to trounce such disadvantages also, the research used GA for the prediction of multi models. Initially, the authentication is performed by means of the patient. Then, the sensed values are attained as of the ' sensors that are placed inside the bra. Later, the DK-AES algorithm uploads the attained data safely to the hospital public cloud server (CS). Subsequently, the hospital management (HM) system downloads the data securely. The HM-system envisages BC in '2' phases: (1) pre-processing and (2) prediction. Utilizing removal redundancy, replacement of missing attributes, along with normalization, the data is pre-processed. Subsequently, the OKM-ANFIS classification algorithm predicts the disease. If any critical concerns arise, an alert text is sent by the HM to the patient's mobile. In an experimental assessment, the proposed work renders better outcomes than the prevailing methods.

Biography

Dr.V.Savitha obtained her Bachelor of Engineering degree from Bharathiyar University Coimbatore in 2002, Master of Engineering Degree from Anna University, Coimbatore in 2010 and obtained PhD from Anna University, Chennai, India in 2021. Currently she is working as an Assistant professor in the Department of Computer Science and Engineering at SNS College of Technology, Coimbatore, Tamilnadu, India and possessing 19 years of teaching and research experience. Her research interest includes Healthcare and IoT, Bigdata and Data Analytics. She has received "Certificate for Recognition" from Center for Research, Anna University for Quality research in 2022. She is a life member of the Indian Society for Technical Education and Member of IAENG.

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Sensing of pesticides using spoof surface plasmons based terahertz meta- sensor

R. Bhati and **A. K. Malik**
Department of Physics, Chaudhary Charan Singh University, India

Sensors are a vital part of modern technology due to extensive variety of applications in various fields such as imaging, medicine, food quality control, and agriculture. Corrugated metal structure based meta-surfaces reinforce Spoof Surface Plasmons (SSPs) at THz frequency similar to the surface Plasmon Polaritons (SPPs) for visible radiation. The spoof surface plasmon modes strongly confine electromagnetics fields at the surface of boundary of the metals, which offer highly sensitive surface to any change in surrounding dielectric environment of the sensing device. We report a spoof surface plasmons based metamaterial THz sensor that shows two very sharp resonances. The novel THz meta-sensor incorporates square split ring resonator and a + type grooved resonant field confinement or in the transmission geometry. Strong field confinement and surface current distribution are obtained for both resonance modes. We investigate our metasurface for sensing of several pesticides such as pesticides such as Imidacloprid, N, N-Diethyldithiocarbamate sodium salt trihydrate, Daminozide, N,N-Diethyldithiocarbamate sodium salt hydrate, and Dicofol. A significant high sensitivity is observed for both resonant modes. The proposed device is a compact planer and easy to realize, which can be used as highly efficient THz biosensors. The functionality of our sensor can be ettended to other frequency regimes by scaling its dimensions.

Biography

Ruchi Bhati is pursuing PhD under the supervision of Prof. Anil K. Malik. Her research interest includes THz metamaterials based sensors for biomedical applications. She published 4 research articles in international journals of high repute like Springer Nature, IOP, and Elsevier. She has a granted patent. She has presented her research work in several international conferences such as METANANO-2020 organized by ITMO University Russia, and CLEO-2023 at San Jose California, USA and many more. She has received best poster award in PTS-2022 and research excellence award-2021. She attended summer school (2021, 2022) organized by ITMO university, Russia and got 3ECTS for securing more than 85% marks in their exam and training course organized by Princeton University, USA. She has also got selected for DST hands on training program sponsored by DST-STUTI. She has got international travel grant by SERB, Govt. of India to travel USA to present her research work.

A rapid POCT for typhoid employing novel bifunctionalized nanobioprobe

Bhawana Bisht and **Vijayender Bhalla**

CSIR-Institute of Microbial Technology (IMTECH), India

Typhoid fever is an acute illness caused by Salmonella Typhi that can spread throughout the body affecting many organs and may leads to death if left untreated. The current diagnostic gap leads to inaccurate, over-diagnosis of Typhoid leading to excessive use of antibiotics and emergence of extensively drug-resistant (XDR) S. Typhi. Herein, to address the challenges we describe a new rapid color-shift assay based on a novel bifunctional nanobioprobe (Vi-AgNp probe) that is functionalized with specific biomarker Vi polysaccharide and also has the co-presence of Silver (Ag) as enzyme inhibitor. The immunoreactions between the Vi with specific antibodies present in Typhoid patient serum sample forms a shielding barrier over Vi-AgNp probe rendering the enzyme to be active generating enhanced colored output. The coating of Vi polysaccharide on AgNp surface was visualized using HRTEM. The insight of shielding barrier formation by the antibodies was seen under TEM. MST (Microscale thermophoresis) data showed efficient binding of Vi-AgNp probe with urease with Kd 437 nM whereas less binding Kd of 7.43 µM was observed when antibodies are present. The assay was validated using 53 human sera samples and proven effective with 100% sensitivity. The entire procedure is having less operational steps and could be completed within 15 minutes giving visual detection of Typhoidal antibodies. Vi polysaccharide is a widely used vaccine candidate thus the assay meets promising application in serosurveillance as well. Unlike lateral flow based assays, our assay does not require multiple combinations of antibodies for detection. The assay format was also found compatible in paper strip test that provides promising opportunities to develop low-cost on-spot assay for clinical diagnostics.

Biography

Bhawana Bisht is an AcSIR PhD student at CSIR-Institute of Microbial Technology (CSIR-IMTECH) Chandigarh India. She has completed her BSc. Medical Microbiology and MSc. Microbiology from India in 2015. Since 2016, she is working under Dr Vijayender Bhallla (Principal Scientist, CSIR-IMTECH) in the area of Nanobiosensors and diagnostics. Her research interest is developing low cost rapid diagnostics technology for clinical and environmental applications. She has published number of research papers so far in reputed international journals. She has acquired ICMR-SRF grant for 3 years (2019-22) and enrolled for PhD in 2020. Recently, she has been awarded as YUVA SCIENTIST AWARD in an International conference (ICMSD-2022) organised by Central University of Jammu, India. She has also been awarded for Best poster presentation in conferences.

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Qubit and bit-based quantum hybrid secret key generation

Shyam R. Sihare
Department of Computer Sc. & App., Dr. APJ Abdul Kalam Gov. College, India

For the generation of a secret key, hardly a quantum algorithms integrating states and bits have yet developed. Integrating random states and bits is difficult for a combiner component. The underlying problems of the study are the design of a quantum circuit and the concatenation of bits and states. By combining either rectilinear, orthogonal (superposition), or both states with bits, we have investigated three different possibilities for the quantum hybrid protocol. We investigated errors in each case and compared them with regard to decoherence and other quantum mechanics properties by taking into consideration the effectiveness of states during transmission time across an untrusted channel. Furthermore, we observed that key size, state errors, design complexity, and security are all addressed in a reasonable manner for identifying solutions while comparing our results to earlier proposed quantum protocols. Because of this, the suggested key protocol's effectiveness is greater than that of earlier proposed protocols. One figure and one table have been included in the results and discussions.

Biography

Shyam R. Sihare is an assistant professor in the Department of Computer Science and Applications at Dr. APJ Abdul Kalam Gov. College in India. He received his Ph.D. in Information Technology and Cyber Security from the Raksha Shakti University, Ahmedabad, Gujarat, India. His research interests include quantum cryptography, security and privacy in wireless networks, and machine learning. He has published several research papers in reputed journals and conferences.

Impact of semiconductor nanowires in energy harvesting

BESTLEY JOE S[1] and **AARON JAMES S**[2]

[1]*ECE, Kings Engineering College, India*

[2]*University of Technology & Applied Sciences, Oman*

Energy harvesting is indispensable in today's life. As many of the non-renewable energy resources are depleting, many researchers have turned their attention towards developing more renewable resources to sustain life in this earth. One such way to develop alternate energy resource is MEMS energy harvesting. Due to rapid advancement in fabrication techniques, it is easier to develop MEMS and NEMS based energy harvesters.

Many wireless sensor networks are remote and are difficult to power up. Energy that is harnessed using semiconducting nanowires have gained importance as they are able to provide power output when subjected to low frequency mechanical vibrations that are abundantly available in the environment.

Research work based on 3D semiconductor germanium nanowire resulted in good voltage, power and power density values when subjected to low frequency vibrations. This is greatly contributed by the greater charge carrier transport capability due to high mass of electrons and holes. Moreover the harnessed output is larger due to greater mobility and smaller bandgap for germanium semiconductor.

The trade off existing between area and harnessed power output can be minimized using the germanium based semiconductor nanowire energy harvester. Performance analysis have shown significant improvement in the electrical characteristics with respect to area.

Biography

Dr. BESTLEY JOE S graduated from Anna University, Chennai in 2010 with Bachelor's degree in Electronics and Instrumentation Engineering. He received his M.E degree in Applied Electronics from Anna University, Chennai in 2012 and Ph.D degree from Sathyabama Institute of Science & technology in 2022.

He has more than ten years of teaching and research experience. He is currently working as Assistant Professor in the department of Electronics and Communication Engineering at Kings Engineering College, Chennai. His research interests are piezoelectric MEMS and NEMS based energy harvesters.

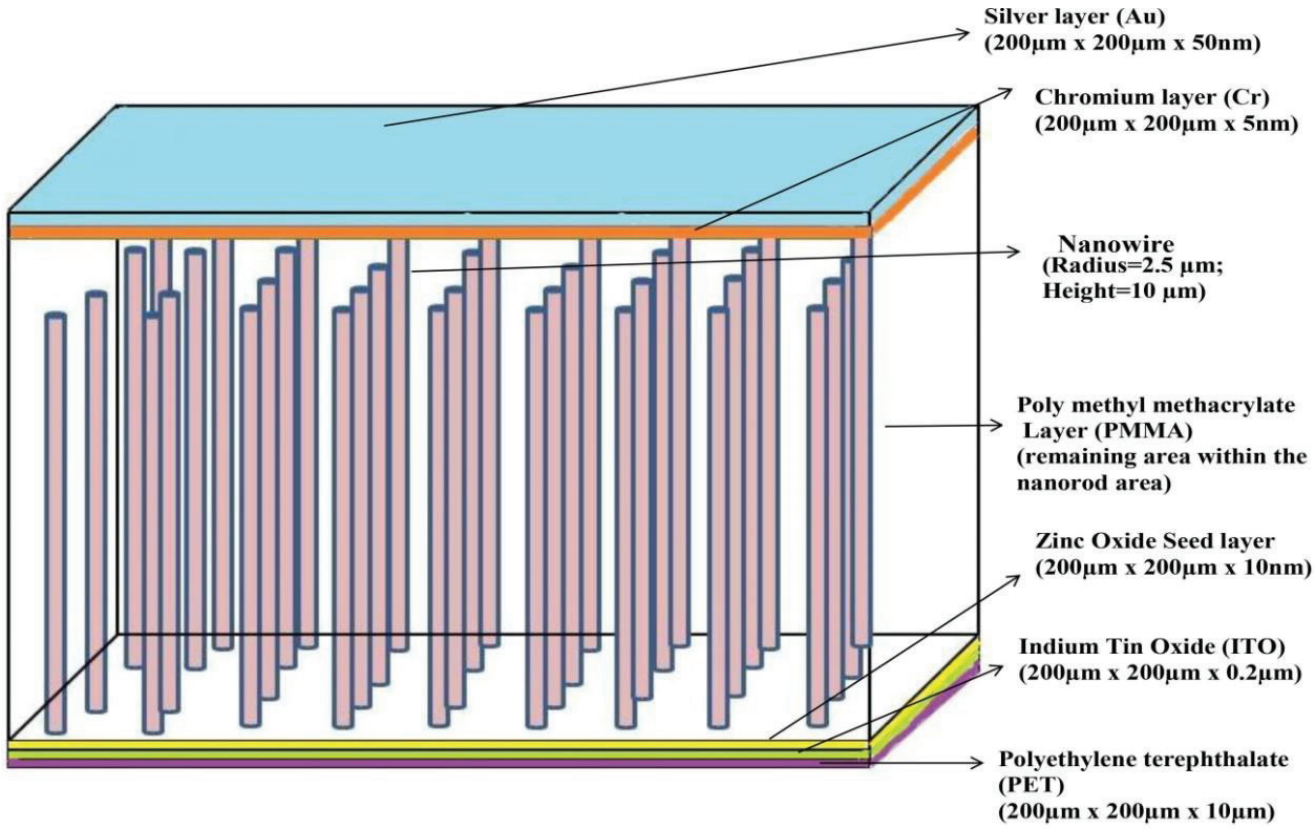

Figure-1: *Overall schematic view of the Semiconductor energy harvester*

Biography

Dr. BESTLEY JOE S graduated from Anna University, Chennai in 2010 with Bachelor's degree in Electronics and Instrumentation Engineering. He received his M.E degree in Applied Electronics from Anna University, Chennai in 2012 and Ph.D degree from Sathyabama Institute of Science & technology in 2022.

He has more than ten years of teaching and research experience. He is currently working as Assistant Professor in the department of Electronics and Communication Engineering at Kings Engineering College, Chennai. His research interests are piezoelectric MEMS and NEMS based energy harvesters.

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Towards accurate brain tumor diagnosis: A pre-trained transfer learning approach using deep features

Jyostna Devi[3], N Veeranjaneyulu[1] and **Konda Raja Sekhar[2]**
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[2]IEEE Senior Member, United States
[3]Advanced CSE Department, VFSTR Deemed to be University, India

According to official statistics, cancer is considered as the second leading cause of human fatalities. Among different types of cancer, brain tumor is seen as one of the deadliest forms due to its aggressive nature, heterogeneous characteristics, and low relative survival rate. Determining the type of brain tumor has a significant impact on the treatment choice and patient's survival. Human-centered diagnosis is typically error-prone and unreliable resulting in a recent surge of interest to automate this process using convolutional neural networks (CNNs). CNNs , however, are not always the most accurate. Also training a CNN from scratch to identify tumor types can be a computationally intensive task. In this project we propose a method to use pretrained models to do the same. We use multiple transfer learning models to extract deep features, from which we extract the most substantial features using PCA. A classifier will then be trained to linearly separate the tumor types. The proposed approach noticeably outperforms its counterparts with an accuracy of 96%.

Biography

Dr Jyostna Devi Bodapati is working as a Professor in the Department of Advanced Computer Science and Engineering, VFSTR Deemed to be University, India. She has receive MTech (CSE) and PhD (CSE) degrees from VFSTR Deemed to be University. She has over 15 years of experience including industry, teaching and research. She worked as a research associate in IIT Madras during 2013-2016. Her research interests include Semi-Supervised Learning for sequential models and Deep learning approaches for Medical image analysis. Her current research focuses on developing Attention based deep neural network models for medical image representation learning. She has experience in developing Semi-supervised and Unsupervised models for sequential problems such as Neural Machine translation and also has experience in developing deep learning based approaches for visual captioning. Her teaching interests include machine learning, deep learning, Data Science, and Natural Language Processing. She has published more than 50 articles in high impact journals and conferences of national and international repute.

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The theory of non-linear non-Parametric method based on bias-variance tradeoff for measurement, calibration, and designing the nanomaterial and nanometrology parameters

Mahendra. Patil[1] and **G.G. Sarate**[2]
[1]*SGB Amravati University, India*
[2]*Government Polytechnics, India*

To increase the accuracy of nano-measurements, a methodology using the principle of integration of information based on common characteristics will be helpful. This is because the measurement at nanomaterial level can change when the particle size decreases to the nanometre size. To include the use of an additional information of the parameters in the mathematical model, an algorithm for including additional (a priory) information in the conditions for measuring the nanostructures and its parameters can be carried out by statistical consideration. Based on statistical consideration, the control link can be formed, which characterizes the deviation of the parameters/characteristics of measuring nano-objects from their nominal values. By increasing the number of measurement methods used in the metrological analysis of nano-objects will increase the reliability and accuracy of measurement results, and each method will provide additional information parameters to create a computerized method of calculating the control link. This control link help to improve further the design at nano-level. This can be converted into new statistical method of measurement and correction. The method with less number of parameter is always beneficial in calibration. Hence one method we are developed for the purposed, using nonlinear nonparametric bias-variance optimization of the said parameters/nanostructure. The statistical method with bias-variance optimization ratio and intersection of confidence interval is local polynomial approximation with minimum parameters. This parameter can be selected depending on the system design parameters. Since the method consider only bias and variance and also under optimum condition explicit knowledge of the bias-variance does not required. Hence its uses in control link help to correct the throughput in nano metrology and nanotechnology easily. The biggest advantages are that the nuisance parameters can be easily avoided by some parameter calibration.

Biography

Mahendra Deoraoji Patil received electronics engineering degree from Govt. Engineering College Amravati and M.Tech degree from IIT, Mumbai, India in 1992 and1997 respectively. He is currently pursuing the Ph.D. from Amravati University, India. He was appointed to a Scientist-B at the Central Scientific Industrials Organization (CSIO), Chandigarh,India in 2002. His interests include statistical methods for image processing, Signal processing, AI, ML, video processing and pattern recognition.

G. G. Sarate, received the Ph.D. degree in optical fibre devices from the Amravati University, Maharashtra, India, in 2006. Presently he is working as HOD &. Prof. Electronics & Telecomm, at Govt. College of Polytechnic, Amravati. His technical Interests are in statistical signal processing and communication engineering. Dr.Sarate recipients of Best Teacher Award in 2006, by ISTE New Delhi, National Award for Promising Engineering Teacher 2010 by ISTE New Delhi, and AdarshSikshakPurskar Award of Govt. of Maharashtra 2010-11 for his creditable and outstanding work in Technical Education for last 20 years.

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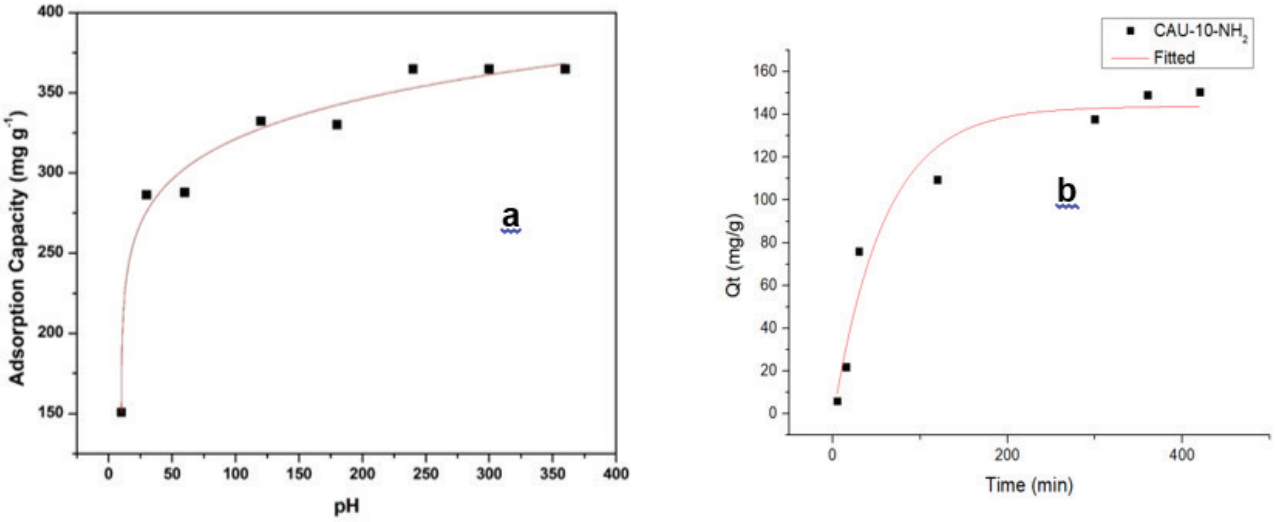
γ-resistant aluminum based metal organic frameworks for remediation of actinide ions from aqueous solutions

Rajesh V. Pai[1,2] and **Nitin Gumber**[1,2]
[1]*Fuel Chemistry Division, Bhabha Atomic Research Centre, India*
[2]*Homi Bhabha National Institute, India*

Because of their structural diversity and tunability in pore architecture, metal–organic frameworks (MOFs) have been emerged into a platform for applications in gas storage, separations, sensing, catalysis, and more. Interestingly, these characteristics are also attractive in the perspective of separations related to nuclear fuel cycle such as actinide/lanthanide separations from different aqueous effluents. But the MOFs for these applications needs to be not only structurally robust but also should be stable under the thermal, chemical, mechanical environment and under high radiation fields. Aluminium based MOFs happens to be the most stable hybrid materials in aqueous environment, besides their low cost and low toxicity. In this work, aluminium based Metal Organic Frameworks (MOFs) such as CAU-10-NH2 and CAU-1 Al NH2 were synthesised by a simple solvothermal method for selective remediation of uranium and thorium respectively from aqueous solutions. The synthesized MOFs were characterized using different techniques like XRD, FT-IR, TGA, SEM, BET analysis and TEM. These MOFs showed good thermal and water stability. The gamma irradiation studies showed a remarkable stability of these materials up to 1 MGy. The specific surface area of the synthesized MOFs possessed a high B.E.T. specific surface area of 400-550 m2/g. Though the synthesized MOFs were stable in moderately acidic and basic conditions, they were not stable at high acidic and basic conditions. A maximum adsorption capacity of 404 mg/g for Th in CAU-1 NH2 and 230 mg/g respectively for U CAU-10-NH2 with good selectivity among many divalent metal ions were observed. Adsorption mechanism studied by FT-IR in sample recorded post actinide adsorption, confirms that adsorption occurs through –NH2 functional group via chelation mechanism. Uranium and Th adsorption kinetics and isotherms were evaluated. The effect of contact time of the MOFs synthesised with Th4+ ion and UO22+ ions are depicted in Fig.1.



Fi.1 *Effect of contact time of (a) CAU-1 NH2 with Th4+ ion; (b) CAU-10-NH2 with UO22+ ion in solution*

Biography

Prof. Rajesh V. Pai, joined Fuel Chemistry Division of Bhabha Atomic Research Centre in 1997 through 40th batch of Training School. Since then he has been working on development of nuclear fuel materials by sol gel process. He obtained his PhD from Mumbai University. He has developed many flow sheets suitable for fabrication of advanced nuclear fuel materials by sol-gel process. He is an expert in synthesizing many technologically important materials such as porous materials like Metal Organic Frame works for separation of actinides and heavy metals, perovskites, pyrochlores, layered perovskites etc. which are used as peizo electric, catalytic, chemical sensors in different applications. He has published about 45 papers in international journals, 3 book chapters and one monograph. He was part of two DAE group achievement awards one in 2013 and 2019. Currently he is a Professor at HBNI, DAE and Head, Fuel Development Chemistry Section, FCD, BARC.

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Electronic band structure modification and optical properties of hydrogenated silicene with fluorination ($SiH_{1-x}F_x$)

R. Santosh[1,2], T. Ball Mukund[1], Y. Suresh[2] and **S. Virendra Kumar[2]**

[1]*V. R. Siddhartha Engineering College, India*

[2]*Indian Institute of Technology (Indian School of Mines), India*

In the recent past, researchers have shown much interest in graphene-like two-dimensional structures, silicene, and germanene, due to their exceptional properties of linear dispersing energy bands, mass-less Dirac Fermions behavior of electrons, high electron mobility, and high spin-orbit coupling (Phys. Rev. B 50 (1994) 14916, Phys. Rev. Lett. 102 (2009) 236804). The band gap of silicene is zero, which precludes the applications of field effect transistors and optoelectronic devices. Hydrogenation is one of the techniques to induce band gap in the band structure of silicene (Applied Physics Letters 97 (16) (2010), 163114). However, it will generate an indirect band gap between valence and conduction bands (Appl. Phys. Lett. 98 (2011) 223107). Therefore authors thought that the modification of the indirect band gap to the direct band by the passivation of fluorine upon hydrogenated silicene. The structural, electronic, optical, and thermodynamic properties of hydrofluorinated silicene have been studied using first-principle calculations. The behavior of the band gap has been analyzed with the increase of fluorine passivation upon hydrogenated silicene. The indirect band gap of hydrogenated silicene is changed to a direct band gap by increasing the fluorine occupation. The stability has been analyzed using binding energy and phonon calculations. The optical properties such as dielectric constant, refractive index, birefringence, and electron energy loss function have been calculated with different occupancies of fluorine upon hydrogenated silicene for the first time. The behavior of heat capacity and Debye temperature is analyzed for hydrogenated, hydrofluorinated, and fluorinated silicene in the range of 5 K to 1000 K temperature.

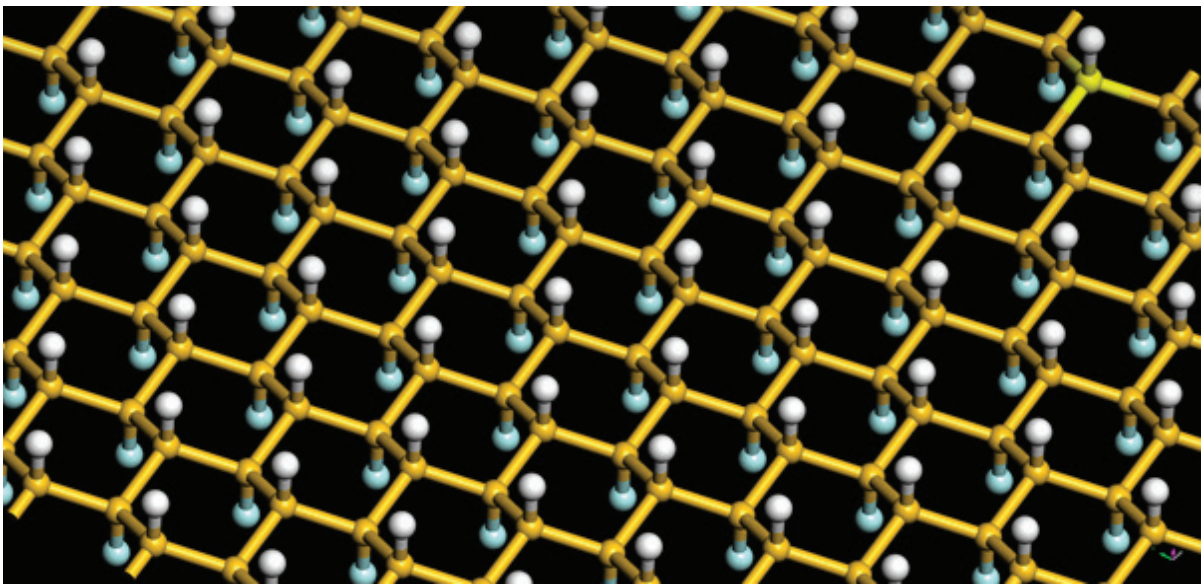

Fig. 1

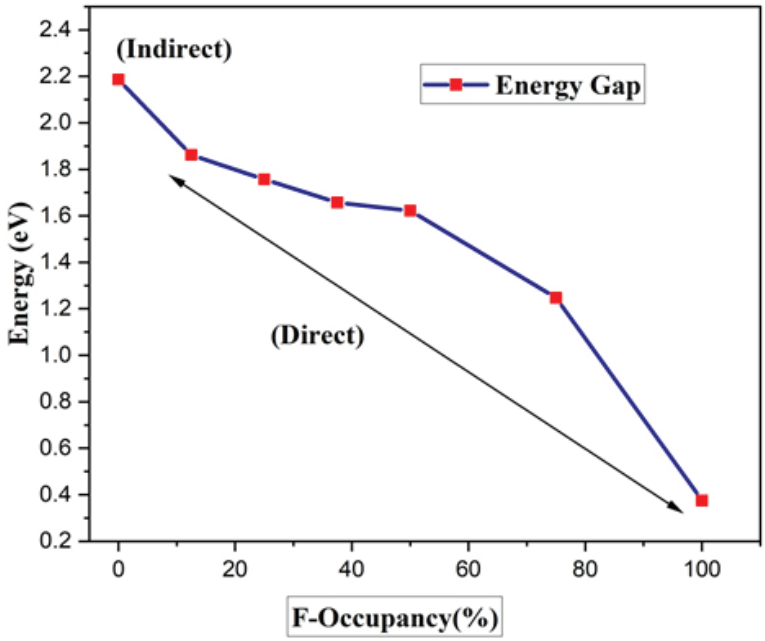

Fig. 2

Biography

Dr. R. Santosh got his Ph.D from IIT(ISM), Dhanbad, and M.Tech from Andhra University, Visakhapatnam, India. His research mainly focuses on the characterization of 2-D semiconductors, simulation, and fabrication of thin film sensors and devices. He published papers in more than 15 SCI Journals of high-quality platforms and participated in several reputed international conferences. Currently, he is working as an associate professor in Velagapudi Ramakrishna Siddhartha Engineering College, Vijayawada, India.

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Software effort estimation using ensemble learning with recursive feature elimination: A Novel approach

K. Eswara Rao and **T. Ravi Kumar**
Aditya Institute of Technology and Management, INDIA.

To develop software, estimating actual effort is important for any organization as there is no chance of getting either overestimation or underestimation. Due to the overestimation of effort, there may be an immediate need to compromise with the quality and testing. Similarly, underestimation may lead to allocating more resource. Compared to some of the early developed estimation techniques, machine learning based approaches are keen to estimate the effort more accurately due to their dynamic adaptivity with any type of data. With the rapid development of software products, many methods fail to satisfy the objective of development in an effective way. In this paper, a novel model based on ensemble learning and recursive feature elimination based method has been proposed to estimate the effort. With the feature ranking and selection method, the proposed method is able to estimate the efforts with the parameters like size and cost. Simulation results are encouraging with the proposed method with COCOMO II dataset.

Biography

Received the bachelor's degree in computer science and engineering from Andhra University in 2007, the master's degree in Neural networks from JNT University in 2009, and the pursing philosophy of doctorate degree in Computer Science and Engineering in GITAM (Deemed to Be University), respectively. Now he is currently working as an Assistant Professor at the Department of Computer Science and Engineering, Aditya Institute of Technology and Management,Tekkali, Andhra Pradesh, India. His research areas include Machine Learning, Software Engineering, Neural Networks, and Data Miming. He has been serving as a reviewer for many highly-respected journals.

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The role of machine learning in enhancing AI creativity with robotics

Pawan Kumar
Kalinga University, India

Artificial Intelligence (AI) creativity, coupled with robotics, has emerged as a dynamic field of research that explores the integration of machine learning techniques and robotic systems to enhance creative capabilities. This abstract explores the role of machine learning in fostering AI creativity within the context of robotics and highlights the advancements made in this interdisciplinary domain.

The abstract begins by discussing the significance of robotics in AI creativity. Robotics provides a physical embodiment to AI systems, allowing them to interact with the physical world, perceive their environment, and manipulate objects. This embodiment opens new possibilities for creative expression, as robots can engage in activities that involve physical interaction, sensory perception, and spatial reasoning.

Machine learning techniques play a crucial role in enhancing AI creativity with robotics. The abstract emphasizes that through machine learning algorithms, robots can learn from data and adapt their behaviors to generate creative outputs. Reinforcement learning enables robots to learn through trial and error, acquiring new skills and optimizing their performance in creative tasks. By leveraging deep learning algorithms, robots can recognize patterns, generate novel ideas, and exhibit creative behaviors.

The abstract further explores specific applications of machine learning in enhancing AI creativity with robotics. For instance, in the domain of visual arts, robots can use machine learning to analyze and understand visual data, enabling them to create unique paintings, sculptures, or other visual artworks. In the realm of music, robots can learn musical patterns and styles, allowing them to compose original pieces or even engage in collaborative performances with human musicians.

Moreover, the abstract highlights the potential of machine learning in fostering human-robot collaboration in creative endeavors. By learning from human input and feedback, robots can adapt their behaviors and creative outputs to align with human preferences and artistic intentions. This collaborative approach combines the unique strengths of humans and robots, resulting in novel and inspiring creative outcomes.

The abstract also addresses the challenges and considerations associated with integrating machine learning and robotics in AI creativity. It discusses issues such as safety, ethics, and the need for explainability and interpretability in robot behavior. Ensuring that AI systems with robotic embodiments adhere to ethical guidelines and promote human values is of paramount importance.

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Development of rGO-AgNP based chemiresistive sensor for ppb level pb(II) detection

Madhurima Deb[1,3], Ankit Dodla[2], Sumit Saxena[3,4] and **Shobha Shukla[3,4]**
[1]Centre for Research in Nano Technology and Science, Indian Institute of Technology Bombay, India
[2]IITB-Monash Research Academy, Indian Institute of Technology, India
[3]Department of Metallurgical Engineering and Materials Science, Indian Institute of Technology Bombay, India
[4]Department of Metallurgical Engineering and Materials Science, Indian Institute of Technology Bombay, India

Developing a chemiresistive sensor that can selectively and sensitively detect trace amounts of Pb(II) ions in aqueous media is a challenging task. However, a solution has been found by creating a sensing platform based on silver nanoparticle (Ag NP) functionalized reduced graphene oxide (rGO) that exhibits a chemiresistive response specifically towards ppb levels of Pb (II) contamination in aqueous media. This sensor was synthesized in a one-step wet chemical process without the need for any additional capping agents for AgNP immobilization. Through systematic investigations into the morphological and chemical states of the sensing element, it was discovered that AgNPs acted as a catalyst for binding the Pb (II) in the rGO-AgNP matrix. Material characterizations revealed that the sensor had a detection limit as low as 1 ppb. Further improvements in the dispersity of the Ag nanoparticles on rGO could enhance the sensitivity of the sensor even more, making it ideal for practical on-field applications.

Biography

Madhurima Deb finished her PhD from Centre for Research in Nano Technology and Science, Indian Institute of Technology Bombay under the supervision of Prof. Shobha Shukla. She is an experienced interdisciplinary researcher in the domain of materials science and sensors. Her research interests include 2D nanomaterial-based sensor development, heavy metal detection and adsorption-based water remediation techniques.

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Nanostructured delivery system as potential vehicle for nutraceuticals: Prospects and perspectives

Pothiyappan Karthik
Department of Food Technology,
Karpagam Academy of Higher Education (Deemed to be University), India

Nanostructured delivery systems have emerged as promising tools for efficiently delivering nutraceuticals, which are beneficial compounds like polyunsaturated fatty acids, carotenoids, polyphenols, vitamins, minerals, antioxidants, flavours, etc., Nutraceuticals have gained attention for their potential health benefits, but their poor solubility, instability, and low bioavailability are the present challenges. Nanostructured delivery systems offer advantages such as improved solubility, stability, controlled release, and targeted delivery, making them attractive for overcoming these challenges. These systems involve encapsulating nutraceuticals within nanocarriers like nanoliposomes, nanoparticles, solid lipid nanoparticles, nanoemulsions, nanohydrogels, and nanocrystals. These nano delivery systems can protect the nutraceuticals from degradation, enable controlled release, enhance absorption and cellular uptake due to the small size and large surface area. There are different approaches have been used to fabricate and optimize nano-delivery systems that include surface modification, co-encapsulation with other bioactive compounds and the incorporation of functional materials for improved stability, bioavailability, and targeted delivery. Natural biopolymers, emulsifiers and surfactants are utilized to enhance the stability, biocompatibility, biodegradability, and sustainability. Nanostructured delivery systems have potential applications beyond oral delivery, including topical, transdermal, pulmonary, and ocular routes. Additionally, combining nanotechnology with advanced techniques like 3D food printing, nanosensors and nanorobotics holds promise for personalized and site-specific delivery of nutraceuticals. In summary, nanostructured delivery systems enable the potentiality of producing designer foods, enhancing the delivery and bioavailability of nutraceuticals. Further research and development are necessary to overcome challenges and fully harness the potential of these systems in nutraceutical applications.

Biography

Dr. Pothiyappan Karthik is currently working as an Associate Professor and Head at the Department of Food Technology, Karpagam Academy of Higher Education (Deemed to be University), Coimbatore, Tamil Nadu, India. Expertise in the area of food process engineering, Food nanotechnology, Encapsulation of bioactives, food colloids, Digestion, Biodegradable packaging and Agro-waste management. He has published several research articles and book chapters, granted international patents and national patents. He is also recognized as an academic editor in Journal Food Processing and Preservation, Journal of Food Quality, International Journal of Food Science and Journal of Nanotechnology. He is serving as Special Issue Lead Guest Editor in Environmental Science and Pollution Research – Springer Nature. He received several awards and honours i.e., "National Young Scientist Award-2022", "Best Research Paper Award-CSIRCFTRI-2013-14" and "CSIR-SRF-2011". He served as an organizing secretory at various National and International conferences. He is a life member of Association of Food Scientists & Technologists (India)-AFST(I).

Deploying heuristic search techniques to reduce task migrations in peer-to-peer volunteer computing networks

Chandrasekar B S
Jain (Deemed to be) University, India

Computations in today's applications necessitate the use of high-performance computing environments. High costs and power management must be addressed while operating in these environments. Volunteer Computing (VC) enables the creation of a global network of computing devices capable of accumulating their computing power to outperform any supercomputer. VC refers to the use of underutilized computing resources donated by thousands of volunteers who want to actively participate in solving common research problems. However, VC systems experience unexpected and sudden loss of connections between volunteers computing resources and the main server. In this case, the server must redistribute the work to new devices as they become available. This process is known as Task Migration, and it is already used in various volunteer frameworks to address the unavailability of computing resources. However, there is a tendency to limit the number of migrations since they are considered as technically complex and time-consuming process. In this article, we employ heuristic search algorithms to reduce task migrations caused by loss of connections in peer-to-peer volunteer networks by locating an alternate network path to send output files to the server when the direct link is no longer available. The simulation results demonstrate that using a heuristic search algorithm eliminates all task migrations caused by the loss of connections, resulting in less total execution time and power consumption. The Breadth first & Depth first algorithm searches have also been compared. The goal of this research is to propose a new approach for reducing task migrations caused by loss of connections in P2P VC systems.

Biography

Prof. Chandrasekar B Shastry is currently Dean, PG studies @ FET in Jain University. Born in 1965, he earned his bachelor & master degrees in '88 & '90 respectively in E&C Engineering domain. He proceeded to get his doctoral degree in 'Fiber Optic Communication' from Indian Institute of Science, Bangalore. He served as Lecturer, Assistant professor, Professor and Head of the Department for both Day & Evening colleges @ BMSCE. He was also Chairman Board of Examinations as well as Studies in Bangalore University & VTU. In 2000, he moved from Academics to Corporate - Infosys Technologies. He worked as a Software engineer, Module leader, Project manager, Senior project manager, culminating as Head for Education & Research in Telecom Software. The client companies included Lucent, Cisco, Nortel, Alcatel, British Telecom & Telstra spanning round the globe. He has travelled widely to present technical papers in Conferences. He has published literature in various journals & forums of International repute. He has 80+ publications with good number of citations. He has repute of guiding 400+ MTech & 14 PhD students; Registered 8 patents under Govt. of India banner. Yes! It has been a journey all along with a good hike too. Incidentally he likes to trek at high altitudes, go snorkelling & make friends.

Design of automated kidney stone detector for healthcare analytics

R. Gunasundari and **K. Viswanath**
Puducherry Technological University, India

In recent years, there is an increase in the number of individuals suffering from kidney abnormalities. Kidney stone prevalence has increased, both in men and women, across all age groups and across all racial/ethnic groups. According to the recent statistics report from the National Health and Nutrition Examination Survey (NHANES), the vulnerability of the kidney stone abnormality even surpasses the effects of several chronic diseases, including diabetes, coronary heart disease and stroke. This inflicts the need for early detection and accurate diagnosis of kidney stones. Urologists undergo enormous stress at the time of surgery related to stone removal in order to precisely locate the stones which may as well be scattered. Presently available scanning approaches in hospitals such as Ultrasound (US) imaging, Magnetic Resonance Imaging (MRI) and Computed Tomography (CT) scanners, do not help in accurate, easy and quick diagnosis of kidney stones. Moreover, identification of minute stones in its initial stage of formation and presence of multiple stones is quite difficult due to low contrast and speckle noise present in the scanned images. This makes the accurate positioning and detection of kidney stones rather a more challenging task. To address these issues, an automated kidney stone detector is proposed and analyzed in this research work by employing image processing techniques for quick and accurate identification of stones present in the US kidney images. The proposed detector offers a lot of testing flexibility for detailed analysis to researchers/developers as it is totally software based primarily running on a laptop/ personal computer without the requirement of any hardware.

Biography

Dr. R.Gunasundari, Professor(ECE) and Associate Director(Academic Research) Department of ECE, Puducherry Technological University (Erstwhile Pondicherry Engineering College), Puducherry 605014 is a well-known researcher in the areas of Sensor networks, Internet of Things, Communication & Computing and Bio-medical Engineering. Dr. R.Gunasundari received her Ph.D degree in the Faculty of Information and Communication Engineering, College of Engineering, Anna University, Chennai under the AICTE Quality Improvement Program in 2009. She completed B.Tech degree and M.Tech degree in Electronics and Communication engineering from Puducherry Technological University. She has 24+ years of teaching, administrative and research experience.

Clad modified Gd doped Sm2O3 coated fiber optics Benzene gas sensors

B. Renganathan

Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, India

In this paper, we deal with the preparation of Gd doped Sm_2O_3 nanomaterials using sol gel preparation and modification of cladding method. The plastic optical fiber with cladding modification is very attractive for gas sensing because of its large dynamic range and high sensitivity. Optical modes propagating through the fiber interact with core and cladding interface and therefore are more sensitive to the changes in the cladding material, for gas sensing. Rare earth oxide is considered as one of the most interesting materials in the field of benzene gas sensors with respect to conventional Gd doped Sm_2O_3 as it can show very good results in the detection of gases. Rare earth doped materials used as sensing material and the spectral characteristics of the sensor are recorded for different concentrations (0–1000 ppm) of benzene. The gas sensor shows a linear variation in the output light intensity with the concentrations .It also includes SEM and EDS and measuring the sensitivity towards gas in ethanol.

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Deep learning with metaheuristics-based data sensing and encoding scheme for secure cyber physical sensor systems

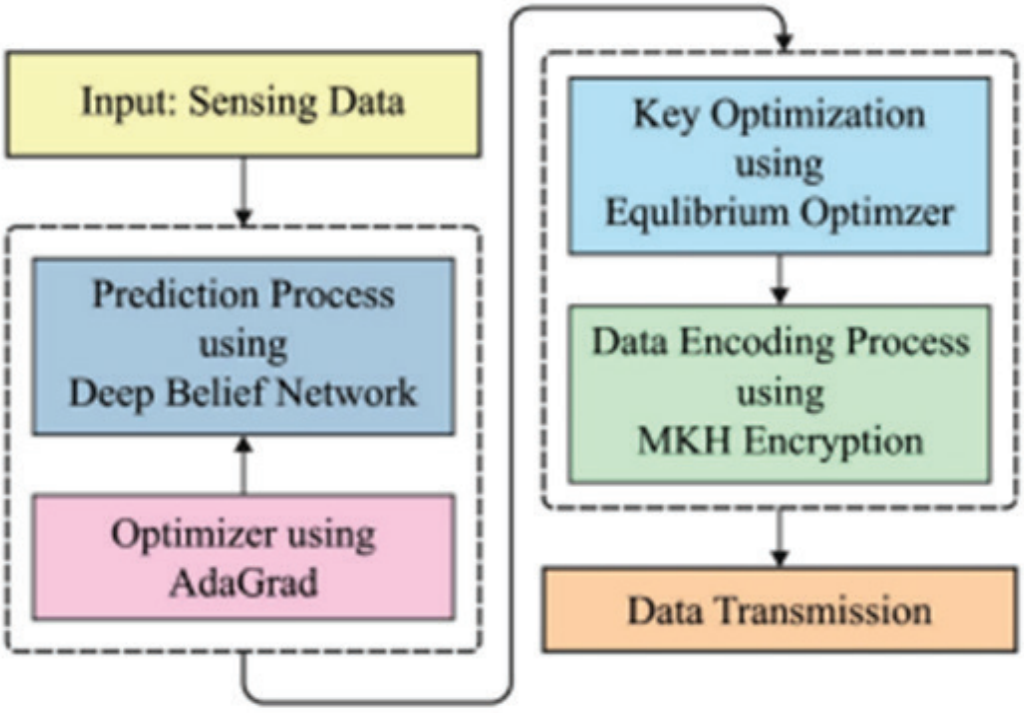
Umesh Dwivedi[5], Ala' A. Eshmawi[1], Mashael Khayyat[2], S. Abdel-Khalek[3], Romany F. Mansour[4], Krishna Kumar joshi[5] and **Deepak Gupta[6]**

[1]Department of Cybersecurity, University of Jeddah, Saudi Arabia
[2]Department of Information Systems and Technology, College of Computer Science and Engineering, Saudi Arabia
[3]Department of Mathematics and Statistics, Taif University, Saudi Arabia
[4]Department of Mathematics, New Valley University, Egypt
[5]Department of Computer Science & Engineering, Babu Banarsi Das Northern India Institute of Technology, India
[6]Department of Computer Science & Engineering, Maharaja Agrasen Institute of Technology, India

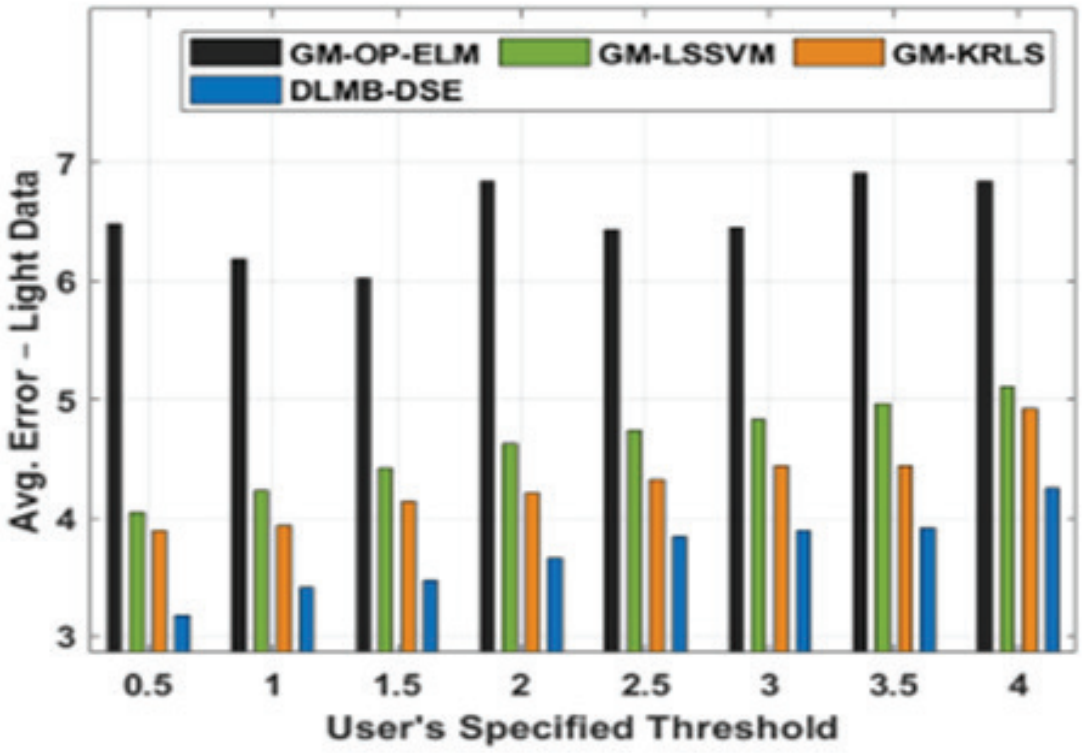
Cyber Physical System (CPS) plays an important role in industry 4.0 applications such as smart factories, smart energy, smart transportation, smart buildings, smart healthcare, etc. Similarly, Cyber Physical Sensor System (CPSS) has gained popularity in recent times and is composed of a computing platform linked to an actuator, sensor, and wireless access point. In real-time scenarios, CPSS continuously gathers data from physical objects and conducts real-time control events based on the process algorithm. Then, the gathered data is transferred to the control center or cloud services via network layer for further processing. In this scenario, there exists a need to identify the way of utilizing the intellect correctly, by designing effective data sensing and fusion schemes for CPSS. With this background, the current paper presents a Deep Learning with Metaheuristics based Data Sensing and Encoding (DLMB-DSE) scheme for CPSS. The aim of the proposed DLMB-DSE technique is to present a prediction-based data sensing and fusion approach to reduce the quantity of data communication and maintain maximum coverage by ensuring security. DLMB-DSE technique involves the design of Optimal Deep Belief Network (DBN) with Adagrad optimizer to primarily predict the data of the succeeding period with minimum number of data items. It also helps in making the primary predicted value, estimate the actual value, with maximum accuracy. Besides, Multi-Key Homomorphic Encryption (MKHE) technique is also applied for useful data encoding and decoding processes, thereby accomplishing security. Moreover, the

novelty of the study lies in optimal key generation process, followed in MKHE technique, using Equilibrium Optimizer (EO). This helps in improving the security. A wide range of experiments was implemented to validate the better performance of the proposed DLMB-DSE technique. The experimental results exhibit the promising performance of DLMB-DSE approach over other methods under different measures.

Figure explains a novel DLMB-DSE technique is presented for the prediction of data sensing and fusion approach to reduce the quantity of data communication and maintain maximum coverage by ensuring security. The proposed DLMB-DSE technique involves a series of operations namely, DBN-based prediction, Adamax-based hyperparameter tuning, MKHE-based encryption, and EO-based optimal key generation process. Adamax and EO techniques are used to accomplish improved security and overall network efficiency. Figure illustrates the working process involved in the proposed method.



A detailed AER analysis was conducted between DLMB-DSE technique and recent approaches under different threshold values and the results are portrayed in graph The results infer that the proposed DLMB-DSE.



Biography

Umesh Dwivedi received his PhD Degree from Dr. A.P.J. Abdul Kalam Technical University, Lucknow, Uttar Pradesh, India in 2020. He is currently working as Associate. Professor in Dept. of Computer Science and Engineering, at Babu Banarsi Das Northern India Institute of Technology, Lucknow, Uttar Pradesh, India. He has more than 20 years of teaching experience and 10 years of research experience in the field of Cloud computing, Artificial Intelligence specially in the field of Deep Learning. He has published several outstanding research publications in national and International Journals. He has published 3 patents in the field of Cloud Computing, Artificial Intelligence and Deep learning. He is also the member of Computer Society of India, International Association of Computer Science and Information Technology (IACSIT) and various other bodies engaged in the field of research.

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Effect of acidic treatment on DSSC performance of TiO_2 nanostructures

Kailas K. Tehare[1], Priyanka K. Bhadke[2], Sambhaji S. Bhande[3] and **Sachin T. Navale[4]**
[1]Department of Engineering Sciences, Ajeenkya D. Y. Patil School of Engineering, India
[2]Department of Pharmaceutical Science and Technology, Institute of Chemical Technology (ICT), india
[3]Department of Physics, Baburaoji Adaskar Mahavidyalaya, India
[4]Department of Electronics and Biomedical Engineering and Institute of Nanoscience and Nanotechnology, University of Barcelona, Barcelona

Solar energy is one of the prominent, green and sustainable alternative renewable energy sources to fossil fuels. In the last decades, solar cells have emerged as one of the best clean energy generation option to resolving energy crises. Specifically, dye-sensitized solar cells (DSSCs) have emerged as a potential option for next-generation solar cells. The effects of the acidic treatment on the photovoltaic properties of the dye-sensitized solar cell (DSSC) were investigated. TiO2 nanostructure was prepared by chemical bath deposition method and the surface was modified by various acidic treatments like hydrochloric acid (HCl), nitric acid (HNO3), sulphuric acid (H2SO4), and acetic acid (CH3COOH). The results exhibited a significant influence of acidic treatments on structural, morphological, optical, electrochemical, and photovoltaic properties. XRD analysis confirms the formation TiO2 nanostructure electrodes. After acidic surface treatment photoconversion efficiency increases from 1.97% (for pristine electrode) to 3.23% (for acetic acid surface treatment). With respect to that electron lifetime increased from 0.34 to 0.54 ms and charge transfer resistance decreased from 25.76 Ω cm (pristine TiO2 electrode) to 17.96 Ω cm.

Biography

I Completed my M.Sc. From SRTM University, Nanded, India in 2006. Completed M.Phil (2012) and Ph.D. (2015) from Same university. During my Ph.D. I worked as visiting Ph.D. scholar in Hanyang University, Seoul, South Korea. Completed Post-doctorate from Shenzhen University, China (2016-18). During the Post-doc tenure also worked as visiting Post-doc Fellow at National University Singapore.

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Impact of machine learning algorithms on various fields

Yeturu Jahnavi
Dr V S Krishna Govt Degree and PG College, India

Machine Learning is used to analyze data from divergent perspectives, summarize it into expedient information and use that information to predict the likelihood of future events. Classification is one of the main problems in the domain of Machine Learning. It is used to classify the predetermined data for the specific class and to predict the class label for unseen data. The aim here is to study various classification algorithms in Machine Learning applied on different kinds of datasets. The algorithms used for this analysis are Logistic Regression, KNN classifier, Decision Tree, Random Forest, Ada Boost Classifier, Support Vector Machine, Gradient Boosting Classifier and Xtrim Gradient Boosting Classifier.

The main contributions are to develop a new heuristic search technique which explores the discrete parameter space dimension wise recursively. Weather analysis is being done using various regression algorithms. In this work Linear Regression, Classification and Regression Tree, Multilayer Perceptron Neural Network and Support Vector Machines are used. For weather analysis various primary atmospheric parameters such as average temperature, average pressure and relative humidity are considered.

Genetics is the clinical review of congenital mutation, where the principal advantage of analyzing genetic mutation of humans is the exploration, analysis, interpretation and description of the genetic transmitted and inherited effect of several diseases such as Cancer, Diabetes and Heart diseases. Evaluation and classification of each and every individual genetic mutation basically predicated on evidence from documented content built on medical literature. Consequently, as a means to build genetic mutations basically depending on the clinical evidences persist a challenging task. There exist various algorithms like one hot encoding technique is used to derive features from genes and their variations, TF-IDF is used to extract features from the clinical text data. A stacking model classifier has been developed to increase the accuracy.

Biography

Dr. Jahnavi Y received her BTech (Computer Science and Engineering) from JNTU, Hyderabad, India, MTech (Computer Science and Engineering) from Sri Venkateswara Univeristy, Tirupathi, India and PhD (Computer Science and Engineering) degree from GITAM University, Visakhapatnam, India. She qualified GATE, APSET and NET examinations. She is a member of CSI, LMISTE, IAENG, IRED. She is currently working at Dr V S Krishna Govt Degree and PG College (Autonomous), Visakhapatnam, Andhra Pradesh, India. She had more than a decade of teaching experience. Her interest areas include Data Analytics, Machine Learning, Natural Language Processing techniques etc. She has been publishing papers in national and international journals. She has been invited as a keynote speaker and chaired various national and international conferences.

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An intelligent graph mining algorithm to analyze student performance in online learning

Sanjay Gour

Jaipur Engineering College & Research Centre, India

Data mining approaches have been widely used to estimate student performance in online education. Various Machine Learning (ML) based data mining techniques have been developed to evaluate student performance accurately. However, they face specific issues in implementation. Hence, a novel hybrid Elman Neural with Apriori Mining (ENAM) approach was presented in this article to predict student performance in online education. The designed model was validated with the student's performance dataset. Incorporating the Elman neural system eliminates the noise data present in the dataset. Moreover, meaningful features are extracted in feature analysis and trained in the system. Then, the student's performances are sorted based on their average score and classified as good, bad, or average. In addition, a case study was developed to describe the working of the designed model. The presented approach was executed in python software, and performance metrics were estimated. Moreover, a comparative analysis was performed to prove that the proposed system earned better outcomes than existing approaches.

A novel hybrid ENAM approach predicted students' performance as bad, average or good. The students' performance dataset was collected and initialized inside the system to validate this model. Moreover, the collected dataset was pre-processed to neglect the noise data. And then the meaningful features were extracted in the feature analysis phase. The extracted features are then trained using the presented approach to classify the student performance. In addition, integrating the Apriori graph mining approach enables the system to count the number of students in each category. The developed model was executed in a python environment, and the result was determined. Moreover, a comparative statistical analysis was performed to verify that the developed model earned better result than others. The comparative analysis proves that the designed data model achieved higher results than existing approaches. Furthermore, the improvement score was determined from comparative and performance assessments. It is observed

that the precision, accuracy, f-score and recall of the present model are improved by 26.93%, 24.39%, 26.93% and 23.94%, respectively. Although the development model attained good result in student performance estimation, the performance of the development model is low in the case of big dataset. Hence, in the future, developing an optimized data mining algorithm with an intelligent neural network will provide better result and improves the significance of online learning.

Biography

Dr. Sanjay Gour is currently working as Professor and Head, Department of Computer Science and Engineering of Jaipur Engineering College & Research Centre, Jaipur. He did Ph.D. in Data Mining. He has published more than 115 research papers with Scopus, SCI, Web of Science Index and UGC recognized journals. He also published 10 books on computer science and Information management including Industry 4.0 AI and Data Science published by Taylor & Francis Publications USA & CRC press London. He also published 08 patents and 02 products app in the domain of computer science. He successfully guided 06 scholars for PhD and 05 are still working under him.

He is a life time member and managing committee member of Computer Society of India and The Institution of Engineers. He is senior member of IEEE. He is certified Trainer for Technical Education Leadership / Management Program by AICTE, UK-India Education & Research Initiative. He served various universities and institutions as visiting Professor / through expert lecture. He is recipients of prestigious "President Rover Award", Best paper Award in IEEE and Springer sponsored international Conferences

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Enhancing RF stability in advanced MOSFET structures for high-bandwidth applications

V. Raju

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The International Technology Roadmap for Semiconductors (ITR) predicts that emerging MOSFET structures, such as Junctionless Transistors (JLTs), will play a pivotal role in applications beyond the 16nm technology node. JLTs have shown promise in analog and radio frequency (RF) applications due to their improved maximal oscillation frequency (fmax) and intrinsic gain. While various studies have explored their analog/RF performance, there remains a significant gap in understanding their RF stability performance, a crucial Figure of Merit (FoM) for oscillator and RF amplifier design.

This presentation aims to address this gap by focusing on the RF stability performance of different JLTs. Firstly, a comprehensive RF stability model will be presented, analyzing the impact of various parameters like spacer material, spacer width, bias conditions, and gate oxide thickness on the RF performance of Double Gate Junctionless Transistors (DGJLTs).

Secondly, the influence of high-k gate dielectrics and spacers on the RF stability performance of Double Gate Junctionless Tunnel FETs (DGJL TFETs) will be explored. Understanding the effects of these materials on the RF stability of the devices is crucial for optimizing their performance in high-frequency applications. Additionally, the role of Junctionless FinFET devices in RF-IC design aspects at high frequencies will be discussed. The presentation will delve into the high-frequency characteristics, including RF stability performance, of SELBOX Inverted-T Junctionless FinFET (SELBOX ITJLFET) devices, with a focus on device geometrical parameter variations.

Finally, the stability factor (K) and critical frequency (fk), along with their dependency on small signal parameters such as Fin height (Hfin), Fin width (Wfin), Source underlap spacer length (LUS), and SELBOX length (LSELBOX), will be thoroughly examined. These insights will contribute to the establishment of optimized design guidelines for JLT devices, ensuring their suitability for high-bandwidth applications.

In conclusion, this presentation addresses the critical aspect of RF stability in advanced MOSFET structures, contributing valuable knowledge for the design and optimization of JLTs in high-frequency applications.

Biography

Dr. V. Raju is an accomplished researcher and academician specializing in Device Modeling. He holds a Bachelor's degree in Electronics and Communication Engineering from JNTU University, and a Master's degree in VLSI Design from VIT University. Driven by a passion for advanced semiconductor technologies, he pursued a Ph.D. at VIT University, focusing on the behavior and simulation of semiconductor devices. Throughout his academic and research career, Dr. Raju has made significant contributions to the field through over 14 papers published in reputed journals and conferences. He actively participates in the academic ecosystem as a reviewer for prestigious conferences, demonstrating his commitment to promoting quality research. Additionally, he is dedicated to mentoring and guiding students, nurturing the next generation of researchers and engineers in the field of VLSI Design and Device Modeling. Dr. V. Raju's dedication and outstanding contributions have made him a respected figure in the scientific community, driving advancements in semiconductor technologies for the betterment of society.

A novel integrated multiphase crystal system of kavlite for the effective and instantaneous removal of cationic and anionic dyes

C. Kannan and **G. Vidhya Lakshmi**
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Textile dye effluent pollution is one of the major threats to the environment in this generation. Various techniques have emerged to remove the textile dye effluent, but adsorption is the best process for effective removal. Aluminosilicate is one of the universal adsorbents to remove textile effluents from wastewater because of its large surface area and large availability of active/acid sites. But it shows a higher affinity for the cationic dyes alone. This limits the usage for the removal of both cationic and anionic dyes. Moreover, it takes a longer time to attain equilibrium. Herein, we invented an integrated multiphase crystal system of Kavlite (NiO@AS) is nothing but multiphase nickel aluminosilicate. This is prepared by one-pot sol-gel method at room temperature and atmospheric pressure for the effective removal of Victoria Blue (VB) and Metanil Yellow (MY) within a short span of time. It is characterized by XRD, FTIR and HRTEM. Integration of nickel oxide into the aluminosilicate framework creates more active/acid sites in the framework, as evidenced by XRD analysis. Furthermore, XRD results revealed the formation of 6 different phases with 3 different crystal systems in the framework. This could also additionally induce the adsorption performance. This resulted in a faster adsorption rate of VB and MY within 10 and 35 minutes respectively, with 83% removal. The adsorption capacity of VB is higher than that of MY (Experimental Qe = 113.32 mg/g for VB and 20.92 mg/g for MY). This is because of the large availability of possible interaction sites in VB. This work provides a deep insight into understanding the interaction possibilities between the adsorbent and adsorbate interface based on the XRD, adsorption kinetics, isotherms and thermodynamic study.

Biography

Prof.C.Kannan obtained his Ph.D from Anna University, Chennai, India in 1999. He then joined as a research trainee in Tamilnadu petro product limited, Chennai, India from 1999-2001. Later, he joined as Lecturer in APA college, Tirunelveli, India (2001-2004). After, he joined as Lecturer in Periyar University, Salem, India (2004-2008). Then, he joined as a Reader in Manonmaniam Sundaranar University, Tirunelveli, India in 2008 and is a professor since 2014. The current research focus of his group is synthesis of mesoporous solid-acid material for the applications in industrially relevant adsorptive and catalytic processes. He has published 98 articles in reputed journals and has 2 Indian patents. He got 2 awards (NESA Fellowship award and Bharat Vikas Award) for his excellent performance in teaching and research.

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Impact of work function engineering in charge plasma based bipolar devices

Mahendra Gaikwad[1], Lokesh Bramhane[1], Suresh Salankar[1] and **Meena Panchore[2]**
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[2]NIT Patna, India

In this paper, we have explored and justified the reason behind the degradation in the cutoff frequency of the bipolar transistors evolved from the charge plasma concept. It has been observed that if the work function difference present between the emitter metal contact and silicon is greater than or equal to 0.68 eV (ϕ_m - ϕ_{SI} = 4.05 eV - 4.73 eV), it results in increment in the base width which is the inverse of the cutoff frequency. On top of this, two dimensional TCAD simulations of the different bipolar devices also demonstrate the same base width widening effect into the intrinsic region which is present between the base region and collector region. Apart from this, if this difference is exactly equal to 0.5 eV (ϕ_m - ϕ_{SI} = 4.23 eV - 4.73 eV) then the base width widening effect can be completely eliminated from the bipolar devices base on the charge plasma.

Biography

Dr. Mahendra Gaikwad did his BE in Electronics Engineering. He did his M. Tech in Communication Engineering from Indian Institute of Technology (IIT), Bombay in 1998. He did his PhD on "Network -on-Chip Architecture using Perfect Difference Network Topology" from VNIT, Nagpur. Presently he is working as Professor & Head, Department of Information Technology, G H Raisoni College of Engineering, Nagpur and Mentor of GHRCE's Nano-Satellite Program. He is also handling the responsibility of Project Coordinator of GHRCE's Nano-Satellite "GHRCEsat". He is instrumental for development and design of GHRCE's Nano-satellite "GHRCEsat" for Technological demonstration of Inter & Intra communication among Nano-satellite in LEO for satellite constellation. He is instrumental for set up the GHRCE Ground Station to monitor the live status of the Nano-Satellite. GHRCEsat has been successfully launched from Satish Dhawan Space Centre, SHAR, Sriharikota, India using PSLV-C51 launch vehicle on 28th February 2021 at 10.24 Hrs by Indian Space Research Organization (ISRO) in Lower Earth Orbit. He has published 120 research papers in various International and National Journals & Conferences. He has delivered more than 80+ expert lectures, keynote address in various International & National Level Conferences. He is also the recipient of prestigious National Award "Rashtriya Vidya Saraswati Purskar" for outstanding achievement in the field of Engineering & Technology. His research areas of interest are Network- on-Chip Architecture, Perfect Difference Network Topology, Signal Processing, DIP & Speech Analysis and Synthesis.

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THz generation by propagating lasers through magnetized SWCNTs

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[2]*Department of Physics, Alexandra School, India*
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In the paper, a theoretical analysis of terahertz (THz) generation by propagating continuous wave Gaussian laser beams of slightly different angular frequencies (ω_1, ω_2) and corresponding wavenumbers (k_1, k_2) in the array of magnetized single-walled carbon nanotubes (SWCNTs) is provided. The magnetic field is applied transverse to the length of SWCNTs to magnetize the CNTs. The nonlinear variation in the restoration force of the electrons of CNTs makes these CNTs anharmonic CNTs. This anharmonicity in the SWCNTs makes its contribution in the reasonable enhancement of the THz generation. In addition to that, the external magnetic field also proves its utility in the enhancement of the normalized THz amplitude of emitted THz radiation by increasing the nonlinearities of the CNTs. In this way, we can generate well enhanced THz radiation by using magnetized SWCNTs.

Biography

DR. Sandeep Kumar is a research scholar of Physics, Lovely Professional University, Phagwara, Punjab, India. His research is focused in the area theoretical study and generation of THz generation in anharmonic carbon nanotubes and laser-plasma interactions. He has published more than sixteen research papers in reputed international SCI journals. He presented his research work at the various international and national conferences/workshops.

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Green synthesis of copper oxide nanoparticles using stem extract of Commelina diffusa and its activity against flacherie disease of Muga silkworm

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[2]Department of Physics, SBMS College, India
[3]Department of Applied Sciences, Gauhati University, India

Current research and developments in metal oxide nanoparticles are significantly important for various industrial applications like energy, biosensor, medicine, environment, agriculture, industrial wastewater treatment, etc. Amongst all, copper oxide nanoparticles (CuONPs) draw attention worldwide due to the cheapest material and stable chemical/physical properties [1]. However, the high cost of reagents and associated environmental hazards are the major drawback in their synthesis at the industrial level. Green synthesis could be an alternative approach in this case. During our present work, we synthesized the CuONP via the green chemistry method using copper nitrate trihydrate and the stem extract of Commelina diffusa. The climber is a wild inhabitant of the forest of Assam, India with indigenous medicinal value. The synthesized CuONPs were characterized with X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR), UVvis spectroscopy, transmission electron microscopy (TEM), and scanning electron microscopy (SEM) analysis. The TEM analysis confirmed the CuONPs with a particle size range of 20-25nm. Further, we have tested the nanoparticles against the bacterial pathogens isolated from the flacherie disease-infected Muga silkworm. The bioassay was performed by agar well diffusion [2] and colony count method [3]. The CuONPs showed significant bactericidal activity against the pathogenic bacterial strains Bacillus thuringiensis strain S1, Bacillus cereus strain S2, and Stenotrophomonas maltophilia strain S3. The antibacterial activity of CuONPs were found to be the highest against Bacillus cereus strain S2 with a 25mm zone of inhibition (ZOI), followed by Stenotrophomonas maltophilia strain S3 (ZOI=23mm) and Bacillus thuringiensis strain S1(ZOI=22mm) respectively. A similar pattern of antibacterial activity was noticed in the

colony count method with 95-97% killing of the bacterial colonies against Bacillus cereus strain S2. The overall investigation suggests the possibility of the development of green technology for the management of the flacherie disease of the Muga silkworm.

Biography

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Larvicidal and non-target effects of Ricinus communis seed extract mediated silver nano particles

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[2]Department of Botany, University of Delhi, India
[3]Institute of Pesticide Formulation Technology (IPFT), India.
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[5]Department of Biotechnology, School of Lifesciences, India
[6]WHO SEARO Indraprastha Estate, India

Objectives and Scope: New eco-friendly and benign vector control strategies are required to manage vector borne diseases.In this context silver nano particles (AgNPs) can serve as a sustainable, eco-friendlytool for mosquito vector control. In the present study, silver nanoparticles (AgNPs) have been synthesized using Ricinus communis seed extract as a reducing and capping agent and its efficacy was evaluated against the early IV instar larvae of Anopheles culicifacies.

Methods: Silver nano particles have been synthesised using aqueous seed extract of R. communisfor bio reduction 1mM AgNO3. The appearance of yellowish-brown colour evidenced the complete synthesis of nanoparticles. Further the phytochemical analysis of the R. communis seed extracts was done using GC-MS.AgNPs synthesized were characterized using, techniques of Transmission electron microscopy(TEM), Scanning electron microscopy (SEM)and DLS (Dynamic light scattering). FTIR (Fourier-transform infrared spectroscopy) analysed the involvement of various functional groups during nanoparticle synthesis. Botanically synthesized AgNPs (silver nano particles) were also evaluated for their larvicidal activity against Anopheles culicifacies.

Results and Discussion: A gradual change in colour was observed which confirmed the synthesis of AgNPs. Images from SEM and TEM confirmed the spherical morphology of synthesized, AgNPs with size in range of 24- 35 nm. FTIR spectrum clearly established that OH, ether and carbonyl groups from the R. communis seed extract are probably involved in the bioreduction process. Biosynthesized AgNPs exhibited higher toxicity as compared with the aqueous seed extract with LC50 value of 1.698µg/mL. Findings

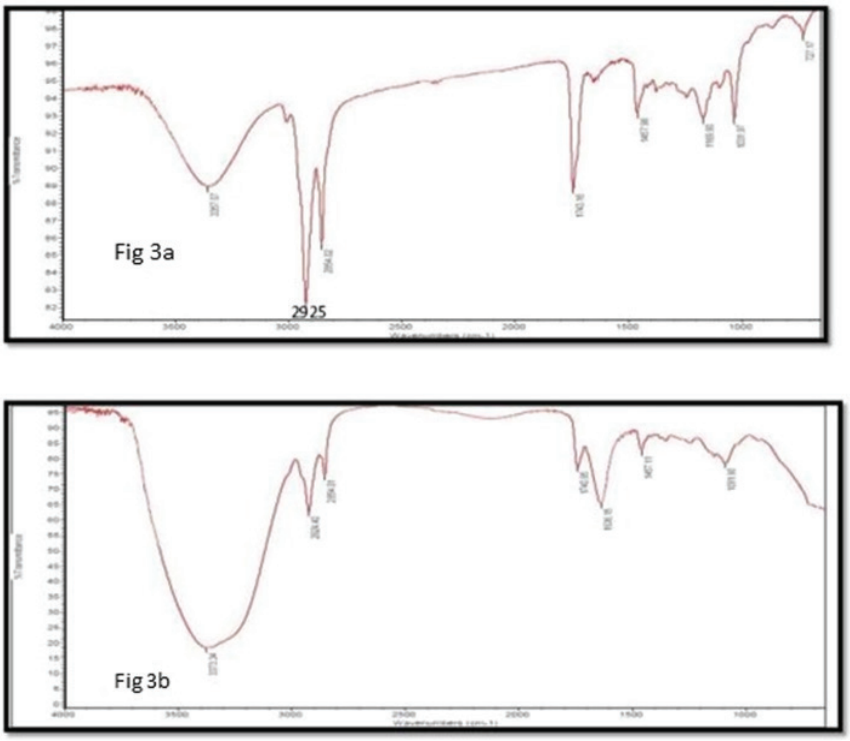

Fig. 3: a) FTIR spectrum of R.communis seed extract b) FTIR spectrum of Rc-Ext-AgNPS

of histological investigations also revealed that biosynthesizd AgNPs exhibited higher toxicity which is manifested by severe lesions on the midgut tissues as compared with crude extract. AgNPs synthesized using R. communis seed extract were found to be safer towards non-target organisms Poecilia reticulata and Diplonychus indicusandMouseN2A neuroblastoma cells.

Conclusion: This study reports a facile, ecofriendly and cost-effective synthesis of silver nanoparticles using R.communis seed extract. The non toxicity of biosynthesized AgNPs towards non target organisms further suggests that AgNPs could be used in integrated vector control approaches.

Biography

Prof. Neera Kapoor is a Professer of Life Sciences (Zoology) in School of Sciences, IGNOU. She has been in this University for around 35 years. Prof. Kapoor has recieved several professional trainings in Medical Entomology and has a vast experience of conducting research projects in diverse areas of Zoology. She has more than 50 national and international publications to her credit. Professor has been actively participating and presenting research papers in national and international seminars / conferernces apart from having experience in organizing seminars/workshops. She is an identified expert in Medical Entomology and Agricultural Entomology. She is in the panel of experts of various national and international organisations / institutions.

Her major area of interest are mosquito ecology, molecular and biochemical basis of resistance in mosquitoes, dengue and chickungunya virus, nano particles for IVM and use of genomic and phenomic tools for studying proteins of Plasmodium. She has guided 15 Ph.D research scholars and 5 students are working under her supervision.

Multimodality image fusion for Alzheimer's disease identification

Siddheshwari Dutt Mishra
MRIIRS, India

The practice of combining several images that are acquired using various imaging modalities is known as medical image fusion. Significant number of investigators are focusing on blending images obtained through multiple modalities to overcome the limited information that is obtained through single modality. Neurological image feature extraction and multi-modality fusion analysis have enhanced performance compared to single modality. To get merged image that contains significant quantity of information to expand the clinical usability of medical imaging, this research focuses on the fusion of MRI and PET neurological scans using discrete wavelet transform. The fused image is then analyzed for the brain's structural deformity and malfunctioning for Alzheimer's disease identification. A multilayered convolutional neural network model is then trained using the fused image that leverages significant features over a single modality image. The model achieved an accuracy of 98.87% when validated with the fused image in contrast to the single image.

Biography

This is Siddheshwari Dutt Mishra, working as an assistant Professor at Computer Science and Engineering Department, Manav Rachna International University, Faridabad, India. My research interest lies in the field of Image Processing, Biomedical Image Engineering using the evolving Machine Learning and Deep Learning Technique. My career spans over 10 years as a teacher with computer skills, mathematics, and database administrator.

Novel approaches: Development of smart and techno materials for gas sensors applications

Vikas B. Patil
Functional Materials Research Laboratory, Solapur University, India

Smart and techno materials are promising applications in many fields, such as chemical and biosensors, supercapacitors, solar cells, nanoscale electronic devices, laser technology, and catalysis. Last few years many researchers are working on to find different approaches to synthesize smart and techno materials containing polymers, metal oxide semiconductors and many more at the nanometre scale to capture the benefit of their enriched properties like surface to volume ratio, sensing, electrical, optical, superior chemical reactivity etc. as compare to their bulk scale equivalents. A smart and techno materials as metal oxides (CeO_2, TiO_2, WO_3, SnO_2, ZnO, CuO, Fe_2O_3 etc.) and conducting polymers polypyrrole (PPy) polyaniline (PAni), etc. are synthesized by different physical as well as chemical techniques as thermal evaporation, simple chemical method, hydrothermal, sol-gel, chemical bath deposition, electrodeposition and electrospinning. The structural, surface morphological, compositional, wettability as well as optoelectronic transport properties of functional nanomaterials are studied and characterized by advanced microscopy techniques. (XRD, RAMAN, FTIR, FESEM, HRTEM, EDS, AFM, XPS, CA etc.) A smart and techno materials of polymers, metal oxides and their hybrids were used as a sensing material for detection of NO_2, NH_3, H_2S, SO_2 toxic gases. A novel flexible, high-sensitive, selective, and room temperature operable polyaniline-based hybrid (PAni/WO_3 PAni/α-Fe_2O_3) ammonia (NH_3) gas sensors were developed onto a flexible polyethylene terephthalate (PET) substrate by in situ polymerization method. The metal oxides nanostructured (nanoparticles, nanoflowers, nanorods, nanowires etc) sensor shows maximal response to various oxidizing and reducing gases along with high selectivity, rapid response/recovery time, notable reproducibility and stability also.

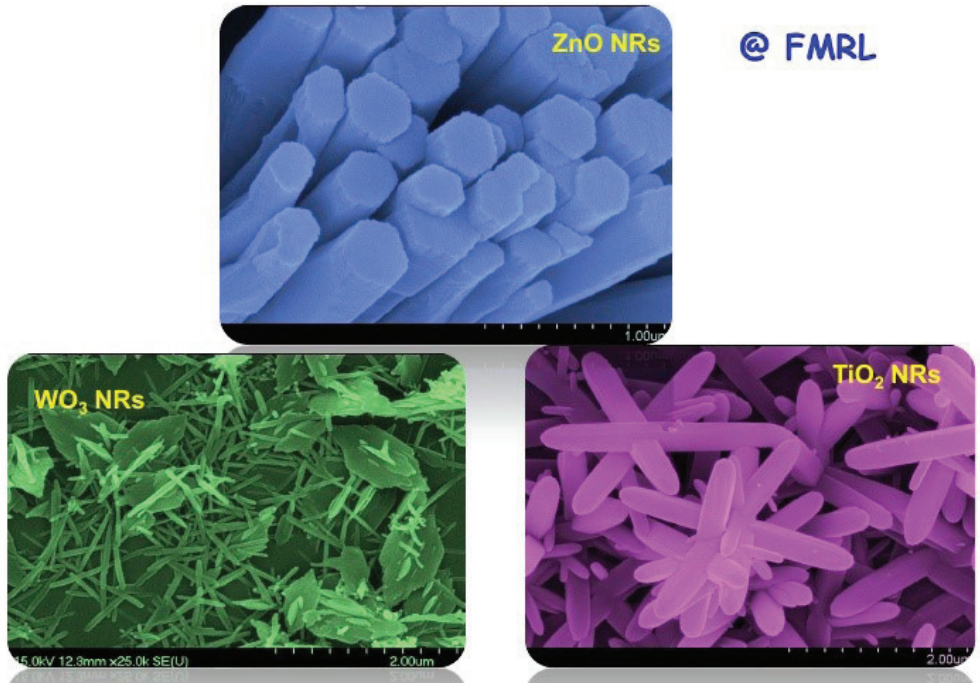

Fig.1 *Functional Materials*

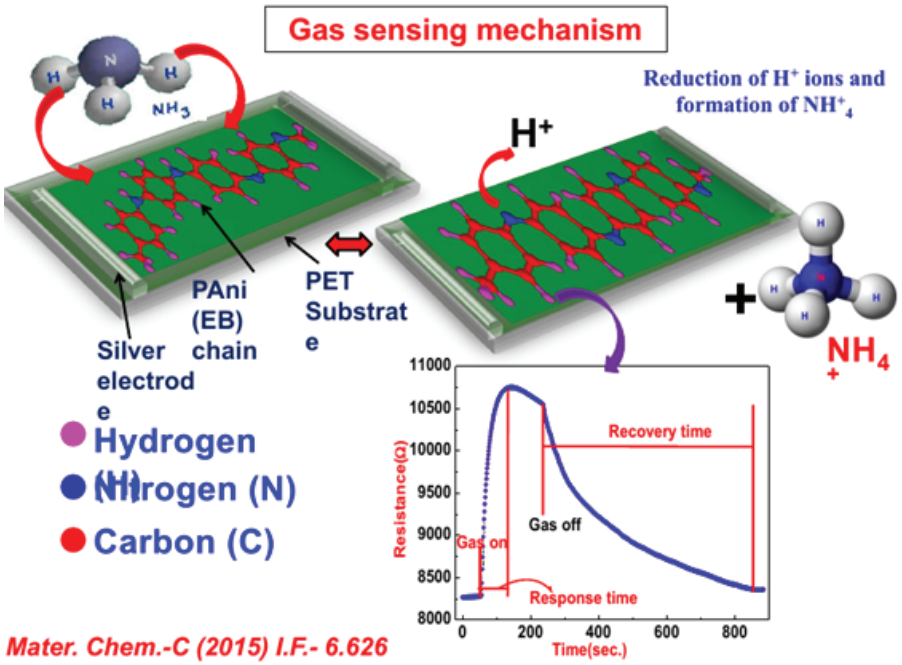

Fig.2 *Gas sensor mechanism*

Biography

Dr. Vikas B. Patil has been Professor and Head, Department of Physics of School of Physical Sciences, Punyashlok Ahilyadevi Holkar Solapur University, Solapur. Prof. Vikas Patil has got an excellent teaching and research experience more than 26 years. He has acted as I/C Vice-Chancellor, I/C Pro Vice-Chancellor of Punyashlok Ahilyadevi Holkar Solapur University, Solapur.

His area of research interest is hybrid Solar cells conducting polymer and metal oxide-based gas sensors, supercapacitors. Under his guidance 16 student successfully completed their Ph.D and 06 student currently working. The processing techniques include chemical oxidative polymerization, in-situ polymerization, sol-gel processing, hydrothermal growth, thermal evaporation, electrospinning, chemical bath deposition and electrochemical deposition.

He has published more than 200 research papers in International peer reviewed journal and His current Scopus citations are 7425 with H-index of 53. He has published 11 books as Research Monographs, Text books. He has also published a 16 book on chapter-Nova, Elsevier, Springer publishers. He has successfully completed 08 research projects and 03 research projects are ongoing. He has granted 4 Patent.

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Defuzzification process and its applications in multi criteria decision making problems

Jagadeeswari Murugan
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Numerous research papers and several engineering applications have proved that the fuzzy set theory is an intelligent effective tool to represent complex uncertain information. In fuzzy multi-criteria decision-making (fuzzy MCDM) methods, intelligent information system and fuzzy control-theoretic models, complex qualitative information are extracted from expert's knowledge as linguistic variables and are modeled by linear/non-linear fuzzy numbers. In numerical computations and experiments, the information/data are fitted by nonlinear functions for better accuracy which may be little hard for further processing to apply in real-life problems. Hence, the study of non-linear fuzzy numbers through piecewise linear functions of interval/triangular/trapezoidal fuzzy numbers have attempted by different methods in the past years. But it is noted that the triangular/trapezoidal approximation of nonlinear fuzzy numbers has more loss/gain of information. Therefore, there is a natural need for a better piecewise linear approximation of a given nonlinear fuzzy number without losing much information for better intelligent information modeling. On coincidence, a new notion of Generalized Hexagonal Fuzzy Number has been introduced by Lakshmana et al. in 2020. Therefore, approximation of nonlinear fuzzy numbers into the hexagonal fuzzy numbers which includes trapezoidal, triangular and interval fuzzy numbers as special cases of Hexagonal fuzzy numbers with less loss/gain of information than other existing methods is attempted. Since any fuzzy information is satisfied fully by its modal value/core of that concept, any approximation of that concept is expected to be preserved with same modal value/core. Hence, a procedure for approximating a non-linear fuzzy number into a new Hexagonal Fuzzy Number that preserves the core of the given fuzzy number is proposed using constrained nonlinear programming model and is illustrated numerically by considering a parabolic fuzzy number. Furthermore, the proposed method is compared for its efficiency on accuracy in terms of loss of information. Finally, the applicability of the proposed method is illustrated through the Group MCDM problem using an index matrix (IM).

Biography

I Dr. M. Jagadeeswari graduated in Mathematics from Vellalar College for Women, Erode, M. Sc in Mathematics from Kongu Arts and Science College, Erode, M. Phil in Mathematics from Sri Vasavi College, Erode. I worked as Lecturer and Assistant Professor at Erode Kongu College of Polytechnic, Sri Vasavi College, Erode respectively. I have been awarded a Rajiv Gandhi National Fellowship by University Grants Commission during my M. Phil program. Then I defended my Ph. D at National Institute of Technology, Tiruchirappalli. Since 2021 I am working as an Assistant Professor at National Institute of Technology, Calicut, Maulana Azad National Institute of Technology, Bhopal, Vellore Institute of Technology, Vellore. I have published eight research articles in SCI, SCIE, Scopus indexed journals. I am serving as a reviewer for seven international SCI, SCIE, ESCI journals. I have taught several courses such as algebra, calculus, allied mathematics, business mathematics, discrete mathematics, basic statistics, mathematics for data science. Fields of research interest: Fuzzy mathematical modelling, fuzzy logic and its applications, techniques, neutrosophic set theory, fuzzy optimization, fuzzy graphs.

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Effective removal of Uranium VI from aqueous solution by using green synthesized nanoparticles: A Fluorimetric study

Fahmida Khan, Komal Kashyap and **Padma Rani Verma**
National Institute of Technology Raipur, India

Now a days, industrialization, fuel spillages, agriculture and livestock farming, changing lifestyles, deteriorate the water quality which leads to damage the environment, health conditions, and the global economy. In addition to these factors, heavy metal and radionuclide pollutants are very toxic and even carcinogenic which makes the water very harmful for drinking and other purposes. Uranium used as radionuclide fuel in nuclear reactor for electricity generation and their wastes pollutes the nearby water resources. From earth`s crust also, naturally occuring uranium undergo leaching into nearby resources. Therefore, removal of uranium, a hazardous water pollutant, from the water resources is of utmost important. The efficient removal and sensitive detection of uranium by the nanotechnology has gained wide attention. Plant mediated green synthesis of nanoparticles (NPs) is considered to be more suitable eco-friendly approach for water-treatment. Nanoparticles have gained prime importance as an efficient adsorbent for the removal of toxic uranium water pollutant. In this proposed research, various NPs were synthesized by using various plant extracts such as testa extract of Anacardium occidental, Citrus lemon (Lemon) peel extract, Nyctanthes arbor- tristis (Harshringar) flower extract for the synthesis of AO-Fe NPs, CeO_2 NPs, CuO NPs and ZnO NPs respectively. These synthesized NPs were characterized by the UV-Visible Spectra, Fourier Transform Infrared (FTIR) Spectroscopy, X-ray Diffraction (XRD) analysis, Scanning Electron Microscopy (SEM) and High Resolution Transmission Electron Microscopy (HR- TEM) analysis. Adsorption studies were carried out for the removal of uranium from aqueous solution. Effect of different parameters such as adsorbent dosage, initial adsorbate concentration, contact time and pH on adsorption of uranium over the synthesized NPs were studied separately. Concentration of Uranium left after adsorption were measured through LED Fluorimeter Quantalase LF-2a. Adsorption

Isotherm and Adsorption Kinetics were studied to determine the behavior and rate of adsorption of uranium over the synthesized NPs. Maximum adsorption capacity (Q0) was determined for adsorption of uranium on the adsorbent

AO-Fe NPs, CeO_2 NPs, CuO NPs and ZnO NPs. These plant-mediated green synthesized NPs proves an efficient adsorbent for the successful removal of uranium from the aqueous solution.

Biography

Dr. (Mrs.) Fahmida Khan has been with Department of Chemistry, National Institute of Technology Raipur, India for the last 37 years and has been working in the position of Professor of Department of Chemistry. She has a Ph.D. in Chemistry, and awarded merit certificate for her research paper by department of atomic energy and Indian Chemical Society, and SERC visiting fellowship by Ministry of Science and Technology. She has competence and expertise in areas such as Teaching, Research, and has been serving many senior level administrative positions. Prof. Khan's Research focuses on nuclear chemistry, analytical chemistry, environmental chemistry, corrosion science, nanomaterials, DNA binding, drug designing, molecular docking, and molecular dynamics simulation of protein-ligand complexes. She has delivered several oral presentations at National and International conferences. She is the author and co-author of numerous peer-reviewed journal articles and book chapters. She serves an active member on Board of Governors, advisory boards and different committees of NIT Raipur, India and as well as for numerous reputed organizations in India.

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Band gap formation of 2D material in graphene: Future prospect and challenges

R. Nandee
Dhaka University of Engineering and Technology, Bangladesh

Graphene, a single particle thicker carbon layer with a hexagonal form, was successfully confined, and the potential electrical impact was observed in 2004. Since a surge in study interest has risen, concentrating on its one-of-a-kind semimetallic property ascribing to the intersection of the π and π* groups at the Fermi level at K and K' focuses in reciprocal space. At energies around the decadence point, these bands are also directly dispersive, resulting in zero-mass quasiparticles (Diracfermions) linked to the equivalence of the two sublattices in the primitive unit cell of graphene. The electron's relativistic nature makes optimal transmission across high potential barriers possible (Klein paradox). As a response, graphene is frequently predicted to be the structural obstruct for future electrical devices. Future semiconductor industries could replace silicon because of its unique electrical and transport capabilities, but it lacks liveliness. For practical applications, the bandgap is a generous limitation. From the earliest starting point, it can be said that halting symmetry may be the most productive methodology to recognize bandgap tenability in graphene. As indicated by uniaxial or in-plane shear strain, the weak cross-section twisting of graphene has led some to believe that most stressed graphene has lost energy below 1eV. The limitations of the present work as well as future research directions were also discussed here. Theoretically, a sizeable band gap of ≥2 eV, tunable bandgap with the desired level, and low contact resistance in metal interfaces are still being explored. Nonetheless, they are less understood. Future studies can be carried out experimentally to resolve the constraints of semiconductors for their applications in a variety of fields.

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Use artificial neural network (ANN) for sorting Trash recycling in Al- Nasiriyah City, south of Iraq

M. Aljaberi[1] and **M. Abid**[2]
[1]*Department of Pollution and Environmental, University of Thi-Qar, Iraq*
[2]*Environmental Research Group, Al-Ayen University, Iraq*

The difficulty of waste technology in smart cities is a critical one, and the temporary measures used to address it have been ineffective. The CE imaginative and prescient for clever towns is presently being slowed down through the issue in accomplishing recycling standards resulting from the sensible problems in rubbish sorting. In this paper, an artificial neural network (ANN)-primarily based totally virtual version is proposed that mechanically types generated rubbish and categorizes the sort of waste according with recycling standards. The recommended version consists of many a complicated classifier is created through combining functions that have been accrued via image processing. Different fashions are advanced primarily based totally on the various functions, and every version outcomes in a single decision. Furthermore, machine learning is carried out to decide the sort of class. The version is proven through except for applicable facts from the dataset, which incorporates 2600 images of ability recycled trash kinds divided into 3 categories. Based at the evaluation, it's far visible that the cautioned version had an accuracy of 91.7%, demonstrating its potential to mechanically type and classify the rubbish according with recycling standards. Overall, this evaluation means that a CE imaginative and prescient this is digitally related may want to decorate rubbish sorting offerings and recycling selections in smart cities alongside the complete cost chain.

Biography

Currently, I have a Ph.D. in Environmental Science and Natural Resources from The National University of Malaysia (UKM). I have to use my skill's and my experience to work and publish many articles related to my study area.I have finished master of Environmental Assessment and Monitoring with 3.88 Cgba (First class) from the National University of Malaysia and I got an excellent academic award. I have experience as senior lecturer and biology assistance in a laboratory and an assistant researcher during my master's and Ph.D. I have always been hard-working and determined throughout my educational career, always putting in 100% effort with any task I must complete, always putting in 100% effort with any task I must complete.

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A numerical study on the hybrid nanofluid flow between a permeable rotating system

Mubashar Arshad and **Ali Hassan**
Department of Mathematics, University of Gujrat, Pakistan

In this comparative research article, the hybrid nanofluid flowbetween rotating rectangular systems is thoroughly analyzed in the incidence of the magnetic and radiative effects. The upper-level sheet is solid and fixed, while the lower-level sheet is permeable and stretchable. Two different combinations of nanoparticles, i.e., Cu/Ag and CuO/TiO_2, with water are considered for preparing a hybrid nanofluid. The arising nonlinear equations are transformed into ordinary differential equations using similarity transformation. The important impacts of different study parameters are analyzed using the boundary value problem technique at MATLAB. The solution convergence is set to be 10−6. The outcomes are presented through graphs and tables. Thermophoresis decreases the temperature transfer rate,while it enhances themass transmission rate and radiation improves the Nusselt and decreases the Sherwood number for both hybrid nanofluids. A higher-temperature transmission rate hybrid nanofluid can be obtained by an appropriate combination of base fluid and nanoparticles.

Biography

Mubashar Arshad is working as a research associate at the University of Gujrat, Pakistan. He has a strong academic background with respect to publication. During his Master's degree, he has published 24 research articles in well recognized international journals and most of them are Q1. Currently, Mubashar is finding a fully PhD sponsored scholarship. He has also reviewed many research articles from different journals like scientific reports, energies, fractal and fractions, international journal of nonlinear analysis and application, journal of engineering mathematics, molecules, nanotechnology reviews, etc.

The advent of nanotechnology as a potential tool for dealing with environmental degradation and climate change issues

Sumanta Bhattacharya
Research Scholar at MAKAUT, India

Now more than ever, people are working to solve environmental and climate change problems by creating innovative scientific tools and methods. As the world's population rises, so too must the sophistication of its ability to adapt to climatic change. When it comes to combating environmental degradation and climate change, nanotechnology has emerged as a crucial tool. The efficiency of environmentally friendly technology is boosted by the fact that particles with quantum properties at the nanoscale have enhanced physical and chemical features. By enhancing the efficiency of the engines, nanotechnology reduces the use of fossil fuels. Nanoparticles are used to boost the performance of biofuel by decreasing its density, raising its cetane number, and raising its calorific value. Break-specific fuel consumption is reduced because nanoparticle addition improves the heat conductivity of the biodiesel-diesel blend. Biodiesel improved by nanoparticles is more efficient and easier to use in today's vehicles. The use of engineered nanomaterials has the same effect on renewable energy as it does on conventional sources. Due to their higher band gap, which allows for more solar radiation to be absorbed, quantum dots may be a better ingredient than silicon in the production of solar panels. It also makes solar panels smaller, which makes them easier to fit on the tops of buildings. Artificial photosynthesis chips based on nanotechnology can store sunlight in photovoltaic cells and generate electricity even when the sun isn't shining. Epoxide-based nanoparticles improve turbine efficiency, leading to greater wind energy production. When used in a sustainable manner, agricultural wastes produce fewer greenhouse emissions thanks to nanotechnology. Producing biofuels like biodiesel, biohydrogen, biomethanol, and bioethanol from agricultural wastes and livestock is sped up with the help of nanocatalysts. Adding nanomaterials to biochar improves its performance and makes it easier to use as an organic fertilizer in farming. By safeguarding the soil ecology, the use of nanomaterials increases soil fertility and decreases the release of greenhouse gases from agricultural soil.

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Effect of cement on clayey silt for stabilization of canal embankments

Shahnawaz Zardai, Riaz Bhanbhro, Muhammad Auchar Zardari, Bashir Ahmed Memon, Aamir Khan Mastoi and **Amjad Hussain Bhutto**

Department of Civil Engineering, Quaid-e-Awam University of Engineering Science and Technology, Pakistan

The influences of clayey silt –cement (cs/c) ratio on the strength, compressibility, and its usability in construction of embankments was examined. Laboratory experiments were carried out to determine the influence of cs/c ratio on shear strength, stress –strain behavior, and volumetric compressibility for determine if cement in soils can be advantageous in controlling the failure of canal embankments. Several breach failures of the canal embankments have occurred and continue to fail due to many reasons including the loss of strength being more frequent. The results indicate that strength parameters i.e., cs/ ratio could increase the cohesion (c) and friction angle (Φ) increased up to 30% when cs/c is 0.85/0.15. The cs/c behaves as strain hardening along axial strains. The cs/c when 0.9/0.1 shows more compressibility as compared to 0.99/0.01. As for vertical strains are concerned, the cs/c showed 13% more strains when cs/c was 0.9/0.1. The preliminary results suggest that, using cemented soils with proper compaction canal embankments can be strengthened to avoid failures.

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Nanoparticles (NPs); role in improving abiotic stress tolerance in plants

U. Ashraf
Department of Botany, University of Education, Pakistan

Now a days, nanotechnology has gained considerable recognition as a promising approach owing to its role in improving the crop growth, productivity, and abiotic stress tolerance in plants. Utilization of nano-scale fertilizers is one of the possible practices of precision farming that could make the crop production systems more efficient, sustainable and environmentally safe by reducing wastage of resources, input, cost and energy. Targeted delivery of nano-scale micronutrients could substantially improve the crop yields, nutrient uptake and recovery and/or fertilizer use efficiency and crop performance under stressful conditions. The NPs are transported within plants through vascular bundles (xylem and phloem), however excess accumulation of NPs in the root and shoot system could induce oxidative stress due to overproduction of reactive oxygen species (ROS) in plants. Application of NPs improves abiotic-stress tolerance in plants by regulating plant physiological processes such as redox regulation, osmotic adjustment and/or activation of antioxidant enzymes. No doubt, application of NPs induces abiotic stress tolerance in plants, however their excess application may cause detrimental effects on morphological, physiological, anatomical and genetic traits in crop plants which largely depends on concentration, size and chemistry of NPs. In sum, the application of nanotechnology in plant science is an emerging area with both for positive and negative impacts on plants, however, future research towards harnessing the positive effects of nanoparticles (NPs) is crucial to enhance the abiotic stress tolerance in plants.

Biography

Dr. Umair Ashraf is a young scientist and serving as an Assistant Professor in the Department of Botany, University of Education, Lahore, Punjab, Pakistan. He got his doctorate degree from South China Agricultural University, Guangzhou China. During his doctorate degree, he has won many international awards i.e., Excellent PhD Dissertation Award, Outstanding International Student Award, Award of Excellence in Research, and Excellent International Student Award. He has published more than 125 research articles in peer reviewed SCI journals with more than 400 cumulative impact factor and 5000 citations. He also authored more than 10 book chapters and numerous news articles. He is also acting as an editor of different SCI journals including PLoS One, Journal of Chemistry and BMC Plant Biology. His area of expertise is plant stress physiology and crop management strategies under stressful environments

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Experimental Repairing of the Defect of Rat Full- Thickness Burn with Cell-Engineered Structure

Ahad Ferdowsi Khosroshahi[4], Linda Mohammadzadeh Boukani[1], Razieh Kheirjou[2] and **Rana Ferdowsi Khosroshahi[3]**

[1]*Tabriz University of Medical Sciences, Iran*

[2]*Department of Anatomical Sciences, Tabriz University of Medical Sciences, Iran*

[3]*University of Tabriz, Iran*

[4]*Tabriz University of Medical Sciences, Iran*

Background: Burn injury is a serious kind of trauma that only affects over 2 million people in North America each year. Current methods of its treatment have not fully solved the problem of graft source supply and recovery of the burn surface. At the present time, one of the most hopeful technique is to use tissue engineering.The decellularization technique has recently expanded in popularity and has become an effective approach for tissue engineering. In this context, the technology of decellularization also allows researchers to more effectively compose multi-material and cell-laden scaffolds with less effort.

Methods: In this work was created a cell-engineered structure based on extracellular matrix with a culture of mesenchymal stem cells (MSCs). A decellularization scaffold derived from ovine small intestinal submucosa (OSIS) with or without stem cells were explored to accelerate burns wound healing. ADSCs were isolated and seeded into the OSIS scaffold. Furthermore, this structure was transplanted to an experimental group of rats with a preliminarily created burn in skin and observed the damage recovery for 21 days. *In vivo* assessment was done using H&E, Trichrome Masson, and IHC staining in the full-thickness burn rat model.

Results: The results represented ADSCs seeded to dOSIS migrate to the site of skin damage and not only differentiate into the skin cells but also induce proliferation and differentiation of resident progenitor cells and result in angiogenesis, epithelialization and granule tissue formation. In the regeneration and maturation phase, the MSCs reduce scar formation and wound contraction and increase collagen expression and wound tensile strength.

Conclusion: The OSIS with or without ADSCs leads to regenerate burn site engrafted with extracellular matrix of skin. The cell-engineered structure has the potential to be used as a wound engraft material in skin burn.

Biography

Ahad Ferdowsi has his expertise in evaluating and improving new treatment methods. Currently, he is working on inventing new treatment methods, including cell therapy, in the repair of tissue defects, especially skin wounds. He developed this model after years of experience in research, evaluation, and teaching and wound management in hospitals and research institutions. These methods are based on the construction and development of cell culture scaffolds and the proliferation and optimization of cell culture methods that provide the possibility of improving tissue defects.

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Role of Cultured Skin Fibroblasts in Regenerative Dermatology

Mohammad Ali Nilforoushzadeh, Ebrahim Khodaverdi Darian, Hamideh Afzali, Mohammad Amir Amirkhani, Mohammadreza Razzaghi, Reza Naser, Amir Behtash Amiri, Alimohammad Alimohammadi, Nahid Nikkhah and **Sona Zare**

Research Center of Legal Medicine Organization of Iran, Iran

The skin, as the largest organ, covers the entire outer part of the body, and since this organ is directly exposed to microbial, thermal, mechanical and chemical damage, it may be destroyed by factors such as acute trauma, chronic wounds or even surgical interventions. Cell therapy is one of the most important procedures to treat skin lesions. Fibroblasts are cells that are responsible for the synthesis of collagen, elastin, and the organization of extracellular matrix (ECM) components and have many vital functions in wound healing processes. Today, cultured autologous fibroblasts are used to treat wrinkles, scars, wounds and subcutaneous atrophy. The results of many studies have shown that fibroblasts can be effective and beneficial in the treatment of skin lesions. On the other hand, skin substitutes are used as a regenerative model to improve and regenerate the skin. The use of these alternatives, restorative medicine and therapeutic cells such as fibroblasts has tremendous potential in the treatment of skin diseases and can be a new window for the treatment of diseases with no definitive treatment. No Level Assigned This journal requires that authors assign a level of evidence to each submission to which Evidence-Based Medicine rankings are applicable. This excludes Review Articles, Book Reviews, and manuscripts that concern Basic Science, Animal Studies, Cadaver Studies, and Experimental Studies. For a full description of these Evidence-Based Medicine ratings, please refer to the Table of Contents or the online Instructions to Authors).

Biography

Academic records:

Degree level of university, place of study, end date

1. Doctor of Medicine, Iran University of Medical Sciences,
2. Specialized of Forensic Medicine of Tehran University of Medical Sciences

Work Experience:

On the right side of the workplace, start date, end date

1. Doctor and lecturer at Hamadan University of Medical Sciences 9/26/1386 3/26/1388
2. Forensic Medicine Expert of Hamedan province
3. Forensic Medicine Expert of Tehran Province
4. Training Experts of the legal Medicine Organization of Iran
5. Head of Forensic Education and Research Department, legal Medicine Organization of Tehran Province.

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Size-dependent dynamical analysis of spinning nanotubes conveying magnetic nanofluid considering surface and environmental effects

Alibeigloo[1], A. Ebrahimi Mamaghani[2] and **H. Sarparast[3]**
[1]*Tarbiat Modares University, Iran*
[2]*University of Tehran, Iran*
[3]*Tarbiat Modares University, Iran*

In this article, a nonlocal strain gradient theory (NSGT) incorporating the thickness effect is developed for dynamics and stability analysis of Y-shaped nanoscale tubes (Fig.1) containing magnetic flow with spin motion in magneto-hygro-thermal environments. A detailed study is also conducted to elucidate the impacts of various parameters, such as magnetic flow, scale parameters, fluid velocity, spin speed, downstream elbow angle, localized masses, attached springs, surface effects, and complex environments on the system vibration. The scale-dependent dynamical equations are obtained using Hamilton's principle. The Galerkin scheme is applied to solve the eigenvalue problem of the system. Stability diagrams and vibrational frequencies are obtained. Furthermore, the divergence threshold of the structure is acquired analytically. The outcomes showed that the destructive effects of moisture and nonlocality on the system stability could be alleviated by the stabilizing effects of the magnetic field, strain gradient parameter, and surface effect. Furthermore, it is found that in low- and high-temperature conditions, the temperature variation has an opposite impact on the system stability. The results can be served as a comprehensive benchmark for optimum design of advanced doubly gyroscopic nanoscale systems transporting nanoflow .

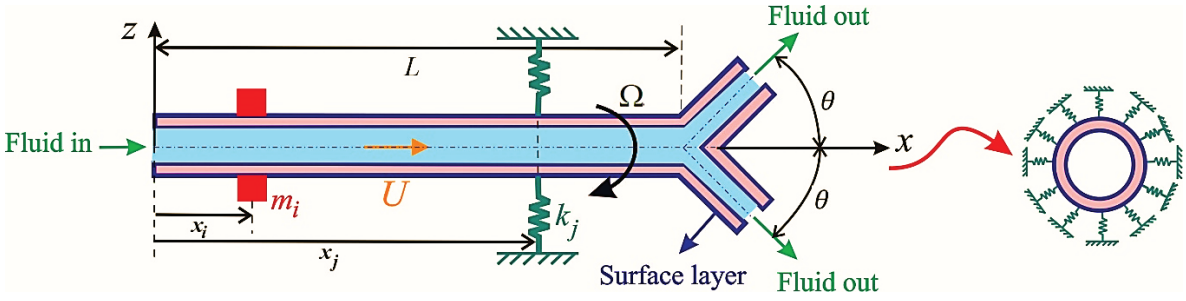

Fig. 1. *Architecture of the nanotube*

Biography

Education

PhD Mechanical Engineering , 2002 (Amirkabir University of Technology, Tehran/Iran)

MSc Mechanical Engineering , 1990 (Amirkabir University of Technology, Tehran/Iran)

BSc Mechanical Engineering , 1987(Amirkabir University of Technology, Tehran/Iran)

Position held:

Professor of Mechanical Engineering, Tarbiat Modares University , Tehran, Iran

Books(In Persian)

1. Mechanical Structures (Beam, Plate and Shell) Mahmood Shakeri, Akbar Alibeigloo, (2009) Iran Amirkabir Press
2. Introduction to theory of plates, Mahmood Shakeri, Akbar Alibeigloo, (2013) Iran Amirkabir Press
3. Introduction to theory of shells , Mahmood Shakeri, Akbar Alibeigloo, (2013) Iran Amirkabir Press

Books(In English)

Three Chapter of "Encyclopedia of Thermal stresses" (Springer 2014)

According to Stanford University I am in the list of world ranking of scientist 2%

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Novel topical and transdermal delivery of colchicine with chitosan-based biocomposite nanofiberous system; formulation, optimization, characterization, ex vivo skin deposition/permeation, and anti-melanoma evaluation

Hamed Morad[1], Mohsen Jahanshahi[2], Jafar Akbari[3], Majid Saeedi[3], Pooria Gill[4] and **Reza Enayatifard[3]**

[1]Department of Pharmaceutics and Pharmaceutical Nanotechnology, Iran University of Medical Sciences, Iran

[2]Nanotechnology Research Institute, Iran

[3]Department of Pharmaceutics, Mazandaran University of Medical Sciences, Iran

[4]Department of medical Nanotechnology, Mazandaran University of Medical Sciences, Iran

Melanoma bears the highest mortality rate in skin cancers. The unique properties of chitosan-based nanofibers provide a great potential to formulate an effective topical drug delivery system. With the emphasis on Colchicine systemic toxicity as an obstacle against the administration in systemic chemotherapy and considering its superiority over approved chemotherapeutic agents for melanoma management, it was chosen to be formulated in a nanofiber based topical drug delivery system. The optimization assay was conducted by AFM and SEM based on the morphology, topographic data, and mean diameter size of the nanofibers. Other characterization studies include FTIR, XRD, STA, contact angle measurement, tensile test, ex vivo skin permeation, deposition analysis, release kinetic and anti-melanoma efficiency against A-375 cell line. As a result, significant colchicine deposition in the skin with remarkable cytotoxicity against melanoma cell line makes it a desirable formulation to be administered as a topical or local reservoir system for neoadjuvant chemotherapy before other interventions and adjuvant therapy of tumors after surgery and, also, for other skin diseases with dose adjustment. Besides, the observed first order release kinetic behavior through the skin could suggest it as a transdermal colchicine delivery system which improves its efficiency in systemic indications.

Biography

Hamed Morad, Pharm.D and PhD in Pharmaceutical Nanotechnology, is faculty member of IUMS in department of pharmaceutics and pharmaceutical nanotechnology at school of pharmacy. His research is focused on the nanostructured drug delivery systems and specially nanofibers, polymeric nanoparticles and metal nanoparticles. His targeted therapeutic aims are wound healing, topical diseases and also chemotherapy. He has several publications in national and international journals and also some patents that have been recorded in WIPO and Patent & industrial ownership organization. He is Vice president of "STMA" Invention and innovation company and Managing director of ''Noavaran Teb Tabarestan"that had been selected as the best knowledge based company of Mazandaran. He was envoy of Iran Nanotechnology Innovation Council in university of MAZUMS. He had been Selected as top researcher of Mazandaran for two times in 2023 and 2014. He has been product manager and also an R&D manager in a pharmaceutical company (FCP-Pharma).

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Phonon mode and thermal conductivity of helix and double-helix carbon nanotubes

J. Davoodi and **N. Mousavi**
Department of Physics, University of Zanjan, Iran

There has been a high interest in carbon nanotube (CNT) fibres due to their extraordinary multi-functional properties recently. In this study, a helix and double-helix CNTs presented with a multi-twisting design that involved a combination of self-twisting and whole-twisting. Non-equilibrium molecular dynamics (NEMD) simulations were performed to calculate the thermal conductivity and phonon mode of twisting CNT fibres.

By comparing the results of self-twisting of isolated (5,5) and (10,10) CNTs with a length of 60 nm, our study showed that the torsional deformation increases the thermal conductivity of CNT. Furthermore, two parallel (5,5) CNTs with a cut-off distance of 0.34 nm were used to build CNT fibres to conduct the effect of different forms of torsional deformation on the thermal conductivity and phonon mode of CNT fibres. Our NEMD simulations showed that self-twisting and whole-twisting increased the thermal conductivity of CNT fibres, when the torsional angle increase from 0 to 360 degree. We observed that the maximum thermal conductivity can be reached by multi-twisting. The maximum value of thermal conductivity measured with an initial self-twisting of 180 degrees followed by whole-twisting of 180 degrees.

Moreover, The Fourier transform was applied to the velocity auto-correlation function of atoms to study the phonon modes of CNT fibres, and the energy spectrums of three different forms of torsion were compared. Regarding the influence of the torsional deformations on the energy spectrum, the results indicated that both in-plane (low frequency) and out-of-plane (high frequency) phonon spectra play a significant role in the thermal conductivity of CNT fibres.

Biography

I am fifty three years old from the Zanjan beautiful city of Iran. I am a full-time faculty member of Physics department at university of Zanjan. My research accomplishments are: MD-based numerical simulation of phase transition (melting & crystallization), MD-based computation of material properties (thermal and mechanical properties) in Nano-scale and Macro scale, MD-based study of Nanostructure. I wrote more than 50 papers in the international journals, also I participated many international conferences and workshops.

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Using hybrid wavelet approach and neural network algorithm to forecast distribution feeders

Mahmoud Zadehbagheri, Mohammad Javad Kiani and **Medi Bagheri**

Department of Electrical Engineering, Islamic Azad University, Iran

In this paper, using an algorithm based on the combination of data based on neural network virology and bacterial nutrition algorithm, improves the performance of the neural network prediction method. Also, the selection of two types of downstream and upstream filters in the wavelet transformation increases the predictive efficacy of neurological prediction. Based on the results, the optimized clustered neural network method has a more favorable response than the other methods. By selecting the appropriate filter and multichannel processing method, the maximum error percentage has improved by 15%. However, compared to the neural network prediction method, the proposed method has more computational volume due to the use of wavelet transform and also three times the use of neural prediction. Due to the large number of layers and used neurons, the neural network method has a much higher computational volume than the linear prediction method, where the linear prediction method has a higher error than the proposed method depending on the data used for training.

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Comparative study of Lutetium-177 and phosphorus-32 in radioactive bone cement for the treatment of vertebral body metastasis

Elnaz Olyaei[1], Mohammad Mohammadzadeh[1] and **Parisa Azimi[2]**
[1]Department of Medical Radiation Engineering, Shahid Beheshti University, Iran
[2]Shahid Beheshti University of Medical Sciences, Iran

Vertebroplasty is a minimally invasive outpatient procedure to stabilize compression fractures in the spine. This procedure involves injecting bone cement into the vertebrae that have been cracked or broken, typically due to osteoporosis.

The cement hardens inside the bones, providing stability to the fractures and supporting the spine. Additionally, radioactive bone cement and brachytherapy sources have been utilized to suppress tumor growth in the vertebral body. We present a novel brachytherapy technique for treating vertebral body metastases using a liquid form of radioactive sources, Phosphorus-32 and Lutetium-177, separately mixed with bone cement and injected into vertebral body bone prostheses. We also investigated the dose distribution of the radioactive bone cement by theoretically calculating it usingGEANT4 Monte Carlo and measuring it using TLD dosimeters for Phosphorus-32 and Lutetium-177 loaded in vertebral bodies. CT-scanned images of each vertebral body (L2 and L3) were imported into GEANT4 for simulation purposes. Two simulations were performed to evaluate the possibility of using PLA prostheses in ex vivo measurements, using bone and PLA material as a bone substitute for brachytherapy of Lutetium-177 and Phosphorus-32. The simulations calculated the dose distribution, dose rates, and deposited dose to the spinal cord and aorta. Next, 3D-printed bone prostheses were drilled and separately filled with bone cement, including PMMA-P32 and PMMA-Lu177, in liquid form using the Vertebroplasty technique. The dose to regions of interest was measured using Thermoluminescence dosimeters.

When comparing the simulated and measured results of dose rates, it was observed that P32 delivers higher doses to normal organs such as the spinal cord and aorta. At the same time, Lu177 has better sparing in these regions of interest. Therefore, while

P32 and Lu177 are suitable for radioactive bone cement treatment, Lu177 delivers relatively lower doses to vital organs such as the spinal cord and aorta. Additionally, Lu177 has characteristics such as a shorter range and lower energies of beta particles in tissue and the presence of gamma rays that make it a better choice for the same treatments. It also provides the possibility of SPECT imaging.

Biography

Elnaz Olyaei is a Master's graduate from Shahid Beheshti University in Medical Radiation Sciences. During her studies, she focused on the development and application of radioactive bone cement in vertebral body cancer metastasis. her work in this area involves investigating the effectiveness of radioactive bone cement in treating metastatic spinal tumors while minimizing radiation exposure to surrounding healthy tissues. She is passionate about using innovative technologies to improve patient outcomes and looks forward to sharing their research at the upcoming conference.

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Green synthesis of nanoparticles: The latest innovations and future perspectives

Azeez Abdullah Barzinjy

Scientific Research Center, Soran University, Iraq

The base of nanotechnology is nanoparticles. The nanoparticles are classified into different classes such as inorganic nanoparticles, organic nanoparticles, ceramic nanoparticles and carbon base nanoparticles. The inorganic nanoparticles are further classified into metal nanoparticles and metal oxide nanoparticles. Similarly, carbon base nanoparticles classified into Fullerene, Carbon nanotubes, Graphene, Carbon nanofiber and carbon black. Nanoparticles are also classified on the basis of dimension such as zero-dimension, one-dimension, two-dimension and three-dimension nanoparticles. The nanoparticles are synthesized by using two approaches like top-down approach and bottom-up approach. Since the main methods for producing nanoparticles are chemical and physical methods which are often expensive and potentially harmful to both the environment and the user. So, we did our best in our researches to synthesize metallic and metal oxide nanoparticles using plant extracts and stay away from expensive and toxic chemicals at the same time. Therefore, it is with great pride that our research group is considered a pioneer in the region, and many high quality research articles have been published by our group highlighting the necessary needs of the community regarding green synthesis nanomaterials. After synthesizing and characterization process, the green synthesized nanoparticles were employed in thin film application, gas-sensing, enhancing solar panel efficiency, wastewater treatment, catalytic application, harvesting sunlight for solar thermal generation and many other applications.

Biography

Dr Azeez Abdullah Barzinjy: was born in Erbil-Iraq. He received his BSc. (Physics) and M.Sc. (Superconducting transmission line) from the University of Salahaddin-Erbil in 1998 and 2004, respectively. He received his Ph.D. in Materials Science at the Materials Science center, University of Leicester/UK in 2014. He is currently Associated Professor in Scientific Research Center at Soran University. He participated in many international and local conferences as a keynote speaker, scientific committee, international advisory board, organization committee and presenter. He is now a pioneer in green nanotechnology and he has many highly impact scientific articles in this field. His current research

interests include Green Synthesis of Nanoparticles, metal electroplating from novel ionic liquids and investigating their properties, solar selective coating, surface plasmon resonance and nanotechnology. He is currently supervising several master and PhD students.

He Organized 1st, 2nd, 3rd, 4th, 5th and 6th International Nanotechnology workshop from 2017-2022 with his colleagues at Tishk International University. Erbil, Iraq. He is member of:

1. American Physical Society since 2008.
2. American Chemical Society since 2011.
3. Royal Society of Chemistry since 2011.
4. Leicester ionic liquids group since 2011.
5. International Nanotechnology association since 2019.

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Graphene-based hybrid nanomaterials for application in nanotechnology

Reza Rasuli and **Hadi Rasuli**

Department of physics, University of Zanjan, Iran

Graphene-based nanomaterials have attracted remarkable attention during the last decade in nanotechnology. In this lecture, we discuss the hybrid nanomaterials based on graphene oxide (GO) and nanoparticles (NPs). We review the synthesis, properties, and applications of immobilized transition metal oxide (TMO) NPs on graphene/GO. We present the TMO NPs immobilizing methods on graphene/GO using physical and chemical methods, including arc discharge, hydrothermal, green chemistry, etc. In addition, we discuss the interaction of the graphene/GO with decorated NPs as metal, n-type, and p-type material and review the physical properties of these materials. In the end, we present promising applications of the graphene/GO-NPs materials for drug delivery, antimicrobial applications, plasmonic and solar cells.

Biography

I received his Ph.D. in 2010 from Sharif University of Technology, Tehran, Iran, for the investigation of mechanical properties of graphene. Currently, I am associated professor at University of Zanjan. My current research interests involve the graphene based hybrid materials and their application as a light-harvesting, hole-transport materials in solar cells, antibacterial coating, and superhydrophobic surfaces.

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Application of electrical resistivity tomography technique for hydrogeophysical characterization of the aquifers within the LWVRB, Ghana

Victor Ofori Agyemang, Emmanuel K. Appiah-Adjei, Gordon Foli Albert Asare and **Bernard Audinada Ampofo**

Geological Engineering Department, Kwame Nkrumah University of Science and Technology, Ghana

The Lower White Volta River Basin (LWVRB) has a serious water supply deficit but the sparse communities in the basin make transporting treated water from one community to the others financially unsustainable. The history of guinea worm and other water-borne diseases associated with the use of untreated surface water within the basin, on the other hand, is a major public health concern. Generally, the traditional vertical electrical sounding (VES) technique has been used in the basin for groundwater exploration but it is proven to be ineffective in the basin. As a result, the suitability of the electrical resistivity tomography (ERT) technique for groundwater exploration has been evaluated in an attempt to improve borehole drilling success rate within the basin. The LWVRB is generally made of three to six geoelectric layers of decreasing electrical resistivity from the top to the bottom. The layers include laterite, dry sandstone, shale, mudstone, saturated sandstone, and siltstone from top to bottom respectively. The laterite showed a resistivity range of 151168-3204509 Ωm, dry sandstone showed 17047-469838 Ωm, shale showed 1922-68887, mudstone showed 217-10100 Ωm, saturated sandstone showed 24-1760 Ωm, and siltstone showed 0-371 Ωm. The very wide ranges of resistivity, borehole yield, borehole depth, and static water level of 10.0-270 l/min, 0-3204509.0 Ωm, 37-151 m and 5.9-18.0 m respectively revealed the high heterogeneity and complex hydrogeological environment of the basin. The study revealed that the selection of lowest resistivity value points as aquiferous zones in mudstone-dominated areas, shallow drilling depths above productive fractured zones and total reliance on the thin shallow weathered sandstone aquifer as the possible causes of the frequent borehole drilling failure, low borehole yields in some communities and drying up of hand-dug wells and some boreholes in the dry seasons. The strong

correlation between the interpreted ERT data and existing borehole data demonstrated the effectiveness of the technique in identifying potential borehole drilling sites in the LWVRB. However, despite its effectiveness, the technique cannot distinguish between water-saturated fractured zone low resistivity anomalies and clay low resistivity anomalies.

Biography

Mr Victor Ofori Agyemang is a professional hydrogeologist with experience in hydrogeophysics, hydrochemistry, groundwater development, water quality and geostatistical modelling. In the area of rural water supply in Ghana, Mr Agyemang has made contributions to the development of groundwater resources. He has BSc in Geology and MPhil in hydrogeology from the University of Ghana. He currently works for the Community Water and Sanitation Agency in the Savannah Region of Ghana as a hydrogeologist. He had previously played the role of a hydrogeologist in the Central Region whiles working as a Water System Manager. He has contributed to numerous projects to provide potable water to some rural communities. He is presently pursuing a Ph.D. in Geological Engineering at the Kwame Nkrumah University of Science and Technology in Kumasi, Ghana. His research focuses on the development of a standard methodology and guidelines to improve the borehole drilling success rate in the Lower White Volta Basin, Ghana.

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Analysis of the spatial and temporal variability of direct rainfall in Lake Tana, Ethiopia

Eshete, Getasew Derso[1], Asmamaw, N. Asitatikie[2], Habtamu, Nega Almnewu[2], Amanuel and **Zewdu Belew[2]**

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The Blue Nile's source, Lake Tana, is the biggest lake in Ethiopia and offers multiple services to local, regional, and international communities. The first step to effectively, efficiently, and sustainably utilize the services that the lake may provide is to analyse its water balance using accurate estimations parameters, including direct rainfall.

Direct rainfall to Lake Tana is one of the most important water balance terms of the Lake that needs precise estimate. This study tries to analyse the spatial and temporal variability of direct rainfall to the Lake and estimate the mean annual and mean monthly direct rainfall to the lake using sufficient data and appropriate methodologies. Thirty years (1986–2015) monthly and mean annual data from 13 meteorological stations were collected and used to analyse the spatial and temporal variability.

Spatial and statistical tools were used for data processing, analysis, and presentation. Five interpolation techniques: Thiessen polygon, spline, isohyetal, inverse distance weighting, and Kriging were considered, and their performances were assessed with evaluation criteria. The results indicate that the isohyetal method is better than the other four methods to implement in a geographic information system (GIS) with Geostatic Analysis in ArcGIS. Further, the analysis has shown that the mean annual direct rainfall to Lake Tana is 1313.43 mm. In addition, we find significant spatial and temporal variability of direct rainfall on Lake Tana. In terms of spatial variability, the Lake gets maximum direct rainfall in the south-eastern part and a minimum value in northwest part with an annual mean value of 1720 mm and 860 mm, respectively. In terms of temporal variability, maximum direct rainfall is estimated in July as 374.11 mm in the summer season and the minimum is less than 12.3 mm in December to March in winter season.

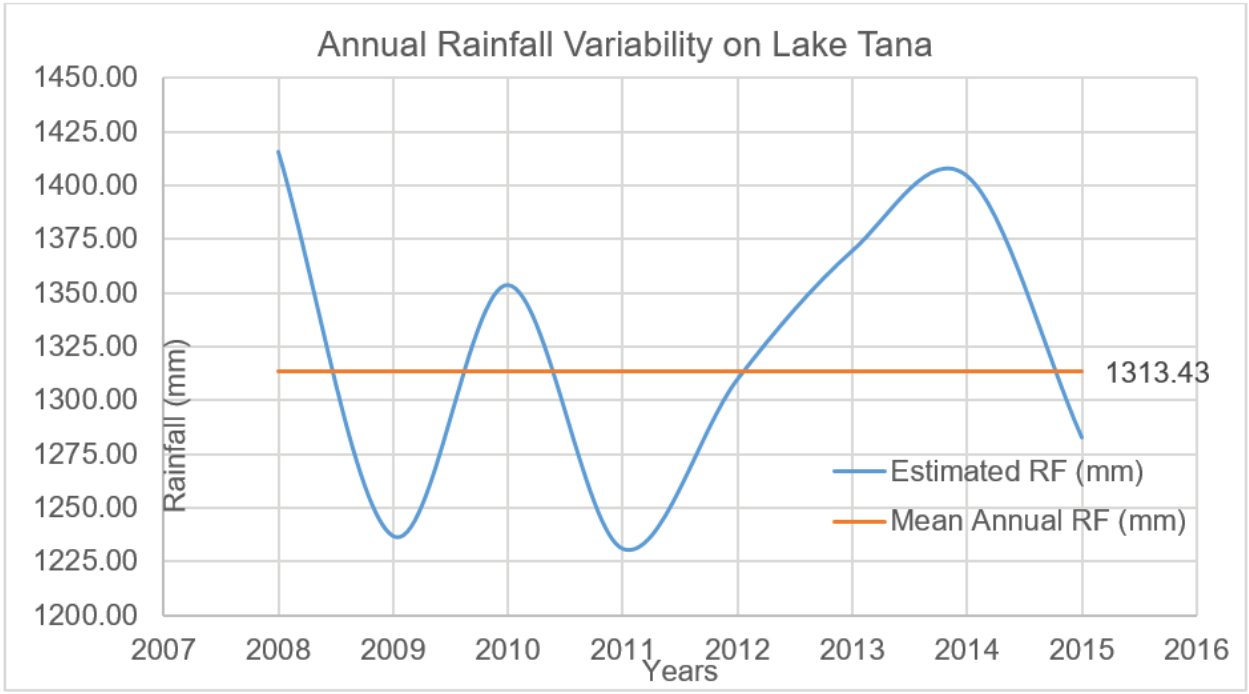

Figure 4 19, *Estimated annual rainfall variability (2008 – 2015) compared with estimated mean annual RF (1986 – 2015)*

Table 4 8, *Annual variability of RF over Lake Tana (2008 – 2015)*

	Annual Rainfall (2008 -2015) data over lake Tana							
Years	2008	2009	2010	2011	2012	2013	2014	2015
Minimum	890	880	888	740	858	664	880	780
Maximum	1910	1718	2245	1980	1820	2200	1960	1758
Estimated mean RF(mm)	1415.9	1237	1353.8	1230.8	1309.8	1369.6	1404.6	1282.6
Mean Annual RF(mm)	**1313.43**							

Biography

Eshete, Getasew Derso is a Project Manager at Abay Construction Private Limited Company, working as a design and construction expert on infrastructure of water supply and irrigation projects. I completed my Masters of Science education at Bahir Dar University, with a thesis titled: - *Analysis the Spatial and Temporal Variability of Direct Rainfall in Lake Tana, Ethiopia.* I am currently writing a research paper on "Trend Analysis of Flood Mitigation in Ribb River, Abay Sub-basin, Ethiopia" for submission to the Applied Science in International Journal of Switzerland in collaboration with Dr. Tom Lotz and Prof. Christian.

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Effect of nanoclay on combustion, mechanical and morphological properties of recycled high density polyethylene/ marula seed cake/organo-modified montmorillonite nanocomposites

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[2]Department of Industrial Chemistry, Ebonyi State University, Nigeria

[3]School of Basic Science (Chemistry), Nigeria Maritime University, Nigeria

The objective of the study is to evaluate the potential for the utilization of recycled high density polyethylene (RHDPE) and underutilized marula seed cake (MSC) as material for the development of composites, as well as reinforcement effect of OMMT on them. Nano-composites based on recycled high density polyethylene (RHDPE), marula seed cake (MSC) and organo-modified montmorillonite (OMMT) were prepared by melt compounding. In order to enhance the weak interfacial interaction between the hydrophilic MSC, hydrophobic RHDPE and OMMT, maleic anhydride-grafted polyethylene (MA-g-PE) was used as a compatibilizing agent. The effects of (MSC, 0, 10, 20, 30, 40, 50 wt %) and (OMMT, 0, 2, 4%) on the combustion, mechanical and morphological properties were studied. Findings of this study show that both MSC and RHDPE can be used in the manufacture of composites. The MSC gave the optimum improvement of tensile and flexural strengths at 10 wt%, while tensile and flexural moduli increased with increasing MSC up to 50 wt %. The optimum improvement of mechanical properties was achieved at 2% OMMT. Increase in MSC loading reduced the heat release rate (HRR), mass loss rate (MLR), burning rate (BR) and limiting oxygen index (LOI), but dramatically increased the time to ignition (TTI) of the composites due to high lignin content which produced char. OMMT increased LOI and TTI but decreased HRR, MLR and BR. The higher the LOI is, the better the flame retardancy of the composite. Morphologies of the nanocomposites were analyzed by SEM and XRD, and the results showed increased d-spacing of clay layers indicating improved compatibility between RHDPE and clay and MSC.

Biography

Dr. Ogah Anselm Ogah is a Senior Lecturer in the department of Polymer Engineering, Faculty of Engineering, Nnamdi Azikiwe University, Awka, Nigeria. He holds a PhD in Polymer Chemistry and Technology amongst other degrees and certificates. He is a seasoned teacher and academic and has published several scholarly works (including books, journal articles, conference papers etc), some of which can be found here [https://scholar.google.com/citations?user=jyVdiosAAAAJ&hl=en].

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Effects of solid beer factory waste as a partial replacement of gypsum for stabilization of weak subgrade soil

Minilik Tamene, Awoke Mesfin, Worku Yifru, Nigus Getu, Destaw Kifile and **Abebe Sewunet**

Debre Tabor University, Ethiopia

Brewery spent grain (BSG) is an agro-industrial solid waste product of the beer manufacturing process. Determine the pozzolanic property and elemental composition of BSG ash after it has been converted to ash. Gypsum (G) is also employed as a stabilizer, but because of its scarcity and expensive cost, it is not suitable. To adjust the strength of expansive subgrade soil, the blending effect is preferred over the individual components. After the completion of the required laboratory analysis for gypsum 5–20% with a 5% interval and BSG ash 5–20% with a 5% interval individually, the subgrade was stabilized. The maximum effect for gypsum stabiliza- tion occurs at 20%, which was the high strength of subgrade. For this percent, the plastic index (PI), linear shrinkage (LS), optimum moisture content (OMC), maximum dry density (MDD), California bearing ratio (CBR), and CBR swell values were 24.93%, 11.43%, 30%, 1.475 g/cm3, 5.51%, and 3.87%, respectively. The best effect of BSG ash stabilized for subgrade strength occurs at 5%, with laboratory results of 36.3%, 15%, 29%, 1.472 g/cm3, 4.97%, and 4.08% for PI, LS, OMC, MDD, CBR, and CBR swell, respectively. The percent of gypsum 20% which have the maximum effect on the strength of subgrade was taken as the total amount for different (G: BSG ash) ratios of 1:1, 1:2, 1:3, and 1:4 in the blending stabilization. The optimum blending effect on the strength of stabilized subgrade occurs at a 1:2 ratio containing 6.7% gypsum and 13.3% BSG ash, with laboratory results of 29.84%, 14.29%, 33%, 1.32 g/cm3, 5.53%, and 3.65%, respectively, for PI, LS, OMC, MDD, CBR, and CBR swell. As a result, at a 1:2 ratio, 13.3% gypsum was substituted with BSG ash, which had a similar effect on subgrade strength due to the optimal percent of gypsum stabilized.

Biography

I am Minilik Tamene Damtie from Debre Tabor, Ethiopia. I have a masters degree in Geotechnical Engineering from Delhi Technological University, India. I have been working as a lecturer and researcher at Debre Tabor University since September, 2016.

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Traditional groundwater exploration method for pastoralist community water supply system in semi-arid region of Ethiopia: Case of Tula Sallan Borana, Southern Ethiopia

Jatani Bonaya and **Sisa Demeku**
College of Engineering and Technology Dilla University, Ethiopia

Traditionally Borana people used to excavate a little depth in the stream alluvium, to collect the groundwater coming from side to side of outflow and use different purposes in arid and semi-arid regions, where there is no visible flow of water along the streams. In Borana semiarid region of southern Ethiopia, groundwater has been used as the source for almost all individual livestock and other domestic water supply systems. Therefore, the assessment and evaluation of traditional groundwater exploration methods is essential for the pastoral communities in arid zone like Borana of southern Ethiopia. Groundwater exploration method is the technique way to inquiry the ground formations, hydrologic cycle, nature of aquifers, and land cover of the study area. Traditional groundwater exploration method is an indigenous task to identifying the location of groundwater availability. Recently, more techniques have developed to explore the groundwater; classified as surface and subsurface methods. Traditional ground water exploration method is the part of the surface method. Traditional groundwater exploration and supply system in Borana is essential in modern hydrology. Traditionally, Borana explored groundwater by three indigenous methods. Traditional Groundwater Exploration Method for Pastoralist Community Water Supply Systems in semi-arid regions and others requires the basic concepts of position in the subsurface geological setup and natural land cover.

Biography

Jatani Bonaya is a young Ethiopian Lecturer who currently working at Dilla University, Ethiopia. He is a community Activist, Author, Teacher, Poet and a youth advocate. He has BSc in Water Supply and Sanitary Engineering and MSc in Civil Engineering, MSc in Project Management, Analysis and Evaluation. Jatani works as a community activist, Environmental defender, Country youth coordinator in Active Youth Initiative (AYI). He presently works as a communication office for African Youth Pastoralists – Ethiopia Chapter. Jatani is a highly active person who has been a community volunteer since the year 2003 when he was a grade three student's and founder of school multimedia and drama writer.

He was recently invited to join the Gayo Pastoralist Community Development in 2022, where he joined the development team to work on community-impacting projects. He is also a member of the Borana Professionals Association BPA, Co-founder of BoSA, Founder of ALSA, and Country coordinator of AYI, coordinator and communication head of AYPI-Ethiopia to guarantee that all youth are included in the fight against climate change and future of pastoralists in face of climate change

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Analysis of overall reliability of embankment dam for steady-state seepage

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The reliability method of slope stability analysis, unlike the deterministic approach, received a series of attention to evaluating the performance of the slope, this method considered uncertainties of the random variables of the soil parameters. This study considered steady-state seepage conditions and the soil variability resulting from the inevitable uncertainties. Uncertainties were managed by Monte Carlo simulation (MCS) for 1000 iterations integrated into Slide 6 software. Both normal and lognormal probability distributions were considered for the most likely value of the soil parameters and the standard deviation of each soil parameter. The standard deviation for each soil was expressed with the soil's coefficient of variation (COV). For the random variable of each of the soil parameters, the stability analysis of the dam by the Morgenstern-price method gave a mean factor of safety (FS) of 1.202, probability of failure (PF) of 0.217% or reliability (R) of 99.783%, reliability index (RI) of 2.608 and 2.827 respectively for a normal and lognormal distribution. Sensitivity analysis showed that FS is more sensitive to the shell material's friction angle (ϕ) than other soil parameters. Moreover, the effect of the surcharge on the probabilistic stability of the dam showed that PF increased and R decreased simultaneously with an increased surcharge load.

Biography

Kelifa Shirago is a senior Geotechnical Engineer lecturer at Arba Minch University, Ethiopia in water technology institute since 2013. He renders intellectual service for undergraduate and postgraduate students in the area of geotechnical engineering. His experience in experimentation and numerical modeling in the area of geotechnical discipline is interesting to cope with challenges that are part of full life in our day-to-day activities. Kelifa shirago graduated his BSc in Hydraulic and Water Resources Engineering and MSc in Geotechnical Engineering in 2009 and 2013 respectively from Arba Minch University Ethiopia.

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Experimental analysis and detection of COVID-19 using support vector machine

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Department of Electrical/Electronics and Computer Engineering, Afe Babalola University Nigeria

Coronavirus Disease 2019 (COVID-19) has recently emerged as a growing concern that has taken the entire world by surprise. This virus's early detection has the potential to save millions of lives. A Support Vector Machine (SVM) method for identifying and classifying COVID-19 is proposed in this study as an early diagnostic method to help clinicians and doctors distinguish COVID-19 from SARS-CoV-2. The discrete wavelet transform (DWT) algorithm was used to extract the features, and the extracted features were classified using SVM. During the classification process, a 2-fold cross-validation was used. Metrics such as sensitivity (Sens), specificity (Spec), accuracy (Acc), and F-score metrics were used to evaluate performance. The proposed SVM method had a 98.2% detection rate. Finally, the performance of the SVM technique was compared to that of existing techniques, and it was discovered to outperform existing results.

Biography

Dr. Ayodeji Olalekan Salau received his B.Eng. in Electrical/Computer Engineering from the Federal University of Technology, Minna, Nigeria. He received his MSc and PhD degrees in Electronic and Electrical Engineering from the Obafemi Awolowo University, Ile-Ife, Nigeria. He is a registered professional engineer with the Council for the Regulation of Engineering in Nigeria (COREN) and a member of the International Association of Engineers (IAENG). Dr. Salau serves as a reviewer for numerous reputable international journals, Co-Chair and technical program committee for various conferences. Dr. Salau has authored/co-authored about 114 articles in a number of reputable international conferences, book series, and major international journals. He has authored 3 books. His research interests include research in the fields of computer vision, image processing, signal processing, machine learning, power systems engineering, and nuclear engineering. He is the recipient of the Quarterly Franklin Membership given by the Editorial Board of London Journals Press for top quality research output in 2020. In addition, Dr. Salau's paper was awarded the best paper of the year 2019 in Cogent Engineering. Furthermore, he is the recipient of the International Research Award on New Science Inventions (NESIN) under the category of "Best Researcher Award" given by ScienceFather in 2020. He is the recipient of the International Best Researcher Award given by the ISSN International Science & Technology Awarding body (IISTAC-2022) in 2022. Also, he was awarded the best researcher award for the year 2020-2022 by the Chancellor of Afe Babalola University, Ado-Ekiti (ABUAD), Nigeria. According to the SciVal (SCOPUS- Elsevier) analysis/ranking of academics, Dr. Salau is among the most productive researchers in Nigeria (no. 28). Presently, Dr. Salau works at Afe Babalola University in the Department of Electrical/Electronics and Computer Engineering.

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