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Abstract Book

3rd Edition of Applied Science, Engineering and Technology Webinar

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V-Robot2021

March 27-28, 2021 | GMT 07:00 – 12:00

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DAY 1

KEYNOTE FORUM

3rd EDITION OF

APPLIES SCIENCE, ENGINEERING AND TECHNOLOGY WEBINAR

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ROBOTICS AND ARTIFICIAL INTELLIGENCE VIRTUAL

MARCH

27-28, 2021

GMT 07:00 – 12:00

V-Applied2021 & V-Robot2021

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Ultrasonic Concentration of Nanoscale Objects

Controlled concentration of nanoscale materials has huge potential applications in the self-assembling of nano materials, fabrication of nano electronic components and nanocomposite materials, high-sensitivity sensing, crystal growth, separation and filtering process, etc. The strategies to ultrasonically concentrate nanoscale materials, which have been developed by the speaker's group, are introduced and discussed. The vortices of acoustic streaming, which are generated by the needle-droplet-substrate system or by the ultrasonic stage, are used in the strategies. The structures, working principles and characteristics of the devices are elaborated. It shows that various micro vortices controlled by ultrasound can be used in the concentration of nanoscale materials at the boundary between a nano suspension droplet and substrate.

Biography

Prof. Junhui Hu has completed his PhD from Tokyo Institute of Technology, Japan, and his and B. E. and M. E. degrees from Zhejiang University, China. He is the deputy director of State Key Lab of Mechanics and Control of Mechanical Structures, China. He is the author and co-author of more than 300 papers and disclosed patents, including more than 100 SCI journal papers, and is the sole author of monograph book "Ultrasonic Micro/Nano Manipulations: Principles and Examples". He is an editorial board member of four international journals, and board member of Chinese Acoustical Society.

Jian Guo Zhou

Department of Computing and Mathematics, Manchester Metropolitan University, Manchester, United Kingdom. E-mail: J.Zhou@mmu.ac.uk

Macroscopic Lattice Boltzmann Model and its Applications

The birth of the lattice Boltzmann method (LBM) fulfils a dream that simple arithmetic calculations can simulate complex fluid flows instead of solving complicated partial differential flow equations. The method is a highly simplified discrete model for fluid flows using a few limited fictitious particles that move one grid at a constant time interval and collide with each other at a grid point on uniform lattices, which are the two routine steps in a standard LBM for the method to simulate fluid flows. As such, a real complex particle dynamics is approximated as a regular particle model using three parameters of lattice size, particle speed and collision operator. The LBM is characterised by its simplicity, parallel processing, and easy treatment of boundary conditions, becoming a very powerful numerical model for many challenging physical problems in the computational fluid dynamics. In this talk, the author's recent development of a macroscopic lattice Boltzmann method (MacLAB) and its extension to other flow equations such as axisymmetric flow equations will be presented. The main feature of the MacLAB is the model contains only stream step and hence lattice size alone is required in simulations. It has three additional advantages, (i) physical variables can directly be retained as the boundary conditions; (ii) computational memory are much less required; and (iii) the model is unconditionally stable. This makes the model efficient and powerful for solving many physical problems in various disciplines of science and engineering.

Biography

Dr. Jian Guo Zhou graduated from Wuhan University with his BSc in River Mechanics and Engineering and subsequently completed his MSc in Fluvial Mechanics at Tsinghua University, China. He received his PhD in Fluid Mechanics from Leeds University, UK. He specialises in formulating mathematical models and developing numerical methods for flow problems in fluids and water engineering. He has authored the pioneering research monograph entitled "*Lattice Boltzmann Methods for Shallow Water Flows*" and published a few influential papers such as surface gradient method for the shallow water equations. He is Fellow of Institution of Civil Engineers.

Luigi Nicolais

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I'm looking for the Light of Science and its benefit

The new EU R&I programme, that promotes excellence by supporting top researchers and innovators, has, for the first time, introduced, in addition to the European Research Council, the European Innovation Council, with the aim to support emerging and breakthrough innovations by SMEs and start-ups. This tool arises from the observation that, in Italy and in Europe, there is a gap between the high level of innovation and competitiveness of researchers and the industrial impact of their scientific results. Materias is an innovative start-up, founded in Italy 4 years ago with the aim to bridging this gap through the creation of new business opportunities by developing innovative science-based technologies in the field of advanced materials. Our value generation model is focused on three steps: i) scouting of ideas, ii) technical-scientific assessments and technology validation through proof-of-concept iii) acceleration through development of a business models. Materias has collected and analyzed over 1000 science-based technologies, signed collaboration agreements with the main Universities and research centers of the Italy, filed over 50 patents and achieved the following results: IP licensing of microneedles technology for transdermal delivery of active molecules, the constitution of a start-up focused on 3D printing of reinforced concrete, signing of an agreement with a big Swiss company for the exploitation of the IP relating to the production of innovative gradient foams. As Leonardo da Vinci already guessed, it is necessary to invest a lot of time and resources trying to move the boundary of knowledge, but we should focus also on what are the applications and benefits of our discoveries.

Biography

Nicolais is Emeritus Professor at Polytechnic School of University of Naples "Federico II". He has written 7 scientific monographs as well as over 600 publications in international journals and he has filed over 70 patents in the field of new technologies and advanced materials. He was Minister of Italian Republic for public Administration Reforms and Innovation from 2006 to the end of legislature. Nicolais is President of COTEC, the Foundation for the improvement of the technological competitiveness of Italy, Spain and Portugal. From 2012 to 2016, he was President of National Research Council of Italy. In 2016 he co-founded Materias.

Albina Cuomo[1] and Domenico Guida[1,2]

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Hydro-geomorphologic application in headwater catchments (Southern Italy)

Since 2010, three catchments, located in the southern Campania region, have been studied using an interdisciplinary approach—geomorphological, hydrogeological, and hydrological— and a hydro-chemical monitoring system. These Mediterranean catchments have been modelled at event time-scales using the HEC-HMS model, adopting object-based hydro-geomorphological class features. For calibrating the hydrologic parameters, the event scale analysis was performed on hydrographs recorded at the outlet of the catchments. The physical-based rainfall–runoff modeling was then conducted using different procedures to optimize the catchment modelling: (1) applying the recession coefficients to each outlet with a newly defined hydro-geomorphologic index (HGmI); (2) assessing the storage coefficient for each sub-basin as a weighted mean of HGmI; and (3) using the storage coefficient associated with the largest HGmI in the sub-basin. The adopted procedures were tested using diverse goodness-of-fit indices, resulting in good performance when the object-based hydro-geomorphotypes were used for the parameter calibration. The adopted procedure can thus contribute to improvements in rainfall–runoff and water budget modeling in similar ungauged catchments in Mediterranean, hilly, and forested landscapes.

Biography

Albina Cuomo gained her degree in Civil and Environmental Engineering in 2007 and has completed her PhD from Civil and Environmental Engineering at University of Salerno (Italy) in 2012. She is now a research fellow at the Department of Civil Engineering at the University of Salerno.

Her research mainly focuses on the hydro-geomorphology of ungauged catchments by using the Electrical conductivity or the gas radon as natural tracer for optimizing the rainfall runoff modelling. She has published several papers in reputed journals and has also been a reviewer for some international scientific journals.

Suaad RIDHA

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Design Requirements for a Resilient City in a Hot and Dry Environment to Face the Challenges in Climate Changes

Designing resilient cities in a hot and dry environment has become the most important priorities for designers to face the challenges of climate changes. Several studies are focused on improving the requirement for the urban design, especially in dry climate because of the necessity to enhance thermal comfort. In previous studies, the researchers highlighted on the importance of vegetation, the green areas, the role of the sky view factor and the design of canyons to lessen the impact of solar radiation in these areas. This study aims to observe all the important requirements that contribute to reducing heat stress occurring from the high intensity of sunlight in the afternoon in cities that have a very long and hot summer. Several requirements have been taken into attention when creating the proposed city such buildings form, street and buildings orientation, aspect ratio, symmetrical distribution for vegetation, the role of albedo for pedestrians passages and the main street. A new design of a resilient city has been proposed on the longest day in the summertime in Baghdad city to face the changes in severe climate. The mean radiant temperature, sky view factor, and air temperature have been analysed using ENVI-met software. Thermal comfort is assessed using the Predicted Mean Vote (PMV).

Biography

Suaad Ridha received her PhD in France from the University of Toulouse, INSA, 2017. She is a member of the Hong Kong Chemical, Biological Environmental Engineering Society (HKCBEES). Name Suaad Ridha, Member NO. : 202594, As a Member of HKCBEES. Member of the World Academy of Science, Engineering and Technology. International Research Conference Scientific and Technical Committee & Editorial Review Board on Civil and Architectural Engineering. Life-time member of Scientific and Technical Research Association (STRA). Member of the Science and Engineering Institute (SCIEI). Reviewer in the International Journal of Environmental Science and Development (IJESD). Member in Scinetific.Net a publisher in material science and Engineering. Editorial Board Members of "Journal of Advanced Research in Civil Engineering and Architecture (JARCEA)". 1st country officer in ”Iraq” member of International Federation of Green and Global Information and Communication Technology (USA).

Rami Hikmat Al-Hadeethi

Expert and Member of Oxford Academic Union, Oxford, United Kingdom.
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Matching 21st Century Skills with Job's Requirements in the Digital Era

The speech will clarify the 21st century skills and abilities that today's students need to keep up with their careers and changing requirements during the digital age. The skills will be categorized in 3 various categories the learning skills, literacy skills and life skills. Each of the three categories will include sub-skills intended to help students keep up with the lightning-pace of today's modern markets. The total number of skills will be 12 and each skill is unique in how it helps students, but they all have one quality in common; all are essential in the age of the Internet. The reason behind focusing on such skills is because any industry is capable of changing at a moment's notice; Industries are now regularly disrupted with new ideas and methodologies. Moreover, the world has entered an era where nothing is guaranteed and customer demand accelerates in all industries along with expectations for newer features, higher-level capabilities, and lower prices. Therefore, with 21st Century skills, your students will have the adaptive qualities they need to keep up with a business environment that's constantly evolving. This is the time when your students need to expand their career readiness skills before they enter the workforce!

Biography

Dr. Rami Hikmat Al-Hadeethi is an international, award winning Professor of Industrial Technology & Operations Management whose solid understanding of business administration in an engineering context, passion for learning, and consultative leadership style are the driving forces behind a progressively successful 29+ year career. He enjoys inspiring students across the EMEA to achieve their full academic and personal potential. He is also a founder of academic departments, colleges and programmes, and participant in worldwide conferences.

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Stereolithographic Additive Manufacturing of Ceramic Components for Geometric Modulations of Energy and Material Distributions

In stereolithographic additive manufacturing (STL-AM), 2-D cross sections were created through photo polymerization by UV laser drawing on spread resin paste including nanoparticles, and 3-D models were sterically printed by layer lamination. The lithography system has been developed to obtain bulky ceramic components with functional geometries. An automatic collimeter was newly equipped with the laser scanner to adjust beam diameter. Fine or coarse beams could realize high resolution or wide area drawings, respectively. As the row material of the 3-D printing, nanometer sized metal and ceramic particles were dispersed into acrylic liquid resins at about 60 % in volume fraction. These materials were mixed and deformed to obtained thixotropic slurry. The resin paste was spread on a glass substrate at 50 μm in layer thickness by a mechanically moved knife edge. An ultraviolet laser beam of 355 nm in wavelength was adjusted at 50 μm in variable diameter and scanned on the spread resin surface. Irradiation power was changed automatically for enough solidification depth for layer bonding. The composite precursors including nanoparticles were dewaxed and sintered in the air atmosphere. In recent investigations, ultraviolet laser lithographic additive manufacturing (UVL-AM) was newly developed as a direct forming process of fine metal or ceramic components. As an additive manufacturing technique, 2-D cross sections were created through dewaxing and sintering by UV laser drawing, and 3-D components were sterically printed by layer laminations with interlayer joining. Though the computer aided smart manufacturing, design and evaluation (Smart MADE), practical materials components were fabricated to modulate energy and material transfers in potential fields between human societies and natural environments as active contributions to Sustainable Development to Goals (SDGs).

Biography

Soshu Kirihara is a doctor of engineering and a professor of Joining and Welding Research Institute (JWRI), Osaka University, Japan. In his main investigation “Materials Tectonics” for environmental improvements of “Geotechnology”, multi-dimensional structures were successfully fabricated to modulate energy and materials flows effectively. Ceramic and metal components were fabricated directly by smart additive manufacturing, design and evaluation (Smart MADE) using high power ultraviolet laser lithography. Original stereolithography systems were developed, and new start-up company “SK-Fine” was established through academic-industrial collaboration.

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Andreas Sicklinger[1]

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Future Aesthetics and Design Education: how to integrate new values with responsibility

The "traditional" values of design: morphology, aesthetics, semiotics and sensorial qualities, inhaling in products their emotional relation to the user, generate the desired success for new products. The question this paper wants to investigate is the way of how these values still dominate the design process in an always more immaterial world, and how educational models can drive the required change of knowledge for a new generation of designers. In this context, besides new possible approaches for teaching new aesthetics and future emotions, VR/AR technologies play an important role. These applications and thus the study of VR / AR technologies reach today almost all design disciplines by considering different applications. This fact creates more than other topics pressure on design education, where course programs in graphic design, media design, fashion design as well as industrial design must incorporate these new technologies in a timely manner. At the same time, the changing approaches to virtual media, accelerated by the global pandemic segregating people's work communities into virtual online faces, it claims for ethical responsibility, because it is the particular human sensibility which is under threat by a complete immersion of the visual senses, which transforms most of the human perception into information. The claim is to think from an academic-humanistic point of view how to integrate and structure the needed knowledge in a responsible way.

Biography

Andreas Sicklinger has completed his studies in Architecture at the Technische Universität in Munich. Working with the Italian Furniture Industry as Product Manager, he became member of Certification committee at the Austrian Standard Institute and lecturer for Applied Ergonomics in different Italian Universities. From 2012 to 2019 he was Hod Product Design at the German University in Cairo/Egypt and since 2018 he is Full Professor for Industrial Design at the University of Bologna/Italy. He has several publications in the field of Ergonomics and Design Education.

Francesco MAROTTA[1], Hala SWEED[2], Reza RASTMANESH[3], Doha RASHEEDY[2], Saida RASULOVA[1], Roberto CATANZARO[4]

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PROTECTING THE LIVER: ZOOMIN IN WHAT'S WORKING WITHIN THE FOGGY MARKETING CLAIMS

The widespread of sort of common sense to "protect the liver" and lack of clear-cut regulatory rules to fit in, has generated with time a rather uncontrolled promotion of herbal compounds from media to supermarkets. This has invariably raised concerns about these products for potential lack of quality control, inner toxic ingredients and interaction with concomitant drugs. Out of a plethora of published TCM compounds, most were based on in in vitro investigations and the less than 100 clinically applied trials suffers by methodological limitations and bias. Some popular herbal extracts such as curcumin, resveratrol, scutellaria, Salvia miltiorrhiza, garcinia cambogia and shisandra have not provided significant clinical results. Others, such as glycyrrhizin could not be converted from cumbersome intravenous administration into oral formulations while Sho-saiko-to, the other promising Japanese natural liver protector was drastically limited after some acute side effects. Silymarin, is one of the oldest and safest TCM but exstensive reviews gave conflicting results probably for the different composition and an unpredictable pharmacokinetics. Ginsenosides represent one of the most famousbut complex TCM, recently have been shown that (Korean Red Ginseng) could remarkably curb inflammation in NALD patients. Similar results have been shown by Berberine By high-technologcal systems, we have managed to isolate the most functionally active moieties Specific Bioactive Fractions (SBF) focussing on the some of the above compound with the best safety/efficacy profile so to widen the target to inflammatory and metabolic pathways. A multicenter investigation has showed very promising results better than the so fa available compounds.

Biography

MD Specialist in Gastroenterology, molecular biology PhD (Japan), MACG (USA). Hon Res. Prpfessor at Nutrition & Food Science, Texas W University. International Advisory member for Nazarbayev University and Min. of Science, Astana, Kazakhstan. Visiting professor and lecturer at major universities in USA (Harvard, S. Diego, S. Barbara), Asia (Tokyo, Kanazawa, Hiroshima, Kyoto, Beijin, Shanghai, New Delhi, Astana etc), Cairo. Won more than 10 internazional prizes. Published more than 200 PubMed papers and 15 book chapters. Cooperated for 10 years with Nobel prof. Montagnier. Directed for 10 years Noguchi Res Center (Japan), Chaired for 1 year a Preventive Med Foundation in Beijin.

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Microstructural Aspects of Transformation Cycles in Shape Memory Alloys

Some materials take place in class of advanced smart materials with stimulus response to the external changes. Shape memory alloys take place in this group, with shape reversibility character and capacity of responding to changes in the environment. These alloys exhibit a peculiar property called shape memory effect, which is characterized by the recoverability of two certain shapes of material at different temperatures. Shape memory effect is initiated by successive cooling and deformation treatments, and activated thermally on heating and cooling. These alloys are plastically deformed in martensitic condition, with which strain energy is stored in the materials keeping the deformed shape, and released on heating by covering original shape on heating. The material cycles between original and deformed shapes on heating and cooling, respectively in bulk level. The crystal structure of materials cycles between the twinned and ordered parent phase structures. This phenomenon is based on crystallographic transformations; thermal and stress induced martensitic transformations. Thermal induced martensitic transformation occurs on cooling along with lattice twinning with cooperative movements of atoms in atomic scale, and ordered parent phase structures turn into twinned martensite structures. Thermal induced transformation occurs as martensite variants with lattice invariant shears in <110 > -type directions on the {110}-type planes of austenite matrix. Martensitic transformations have diffusionless character and movement of atoms is confined to inter atomic distances. Shape memory alloys exhibit another property, called superelasticity which is performed by stressing and releasing. The material is stressed at a constant temperature in the parent phase region and simultaneously recovers the original shape upon releasing. This property is also result of stress induced transformation and crystal structure cycles between ordered parent phase and detwinned structure by deformation and releasing.

Copper based alloys exhibit this property in metastable β-phase region, which has bcc-based structures. Lattice invariant shears and twinning are not uniform in these alloys, and the ordered parent phase structures martensitically undergo the non-conventional complex layered structures.

In the present contribution, x-ray diffraction and transmission electron microscopy studies were performed on two copper based CuZnAl and CuAlMn alloys. X-ray diffraction profiles and electron diffraction patterns exhibit super lattice reflections inherited from parent phase due to the displacive character of martensitic transformation. X-ray diffractograms taken in a long time interval show that diffraction angles and intensities of diffraction peaks change with the aging time at room temperature. This result refers to a new transformation with the redistribution of atoms in diffusive manner.

Keywords: Shape memory effect, martensitic transformations, lattice invariant shear, lattice twinning and detwinning.

Biography

Dr Adiguzel graduated from Department of Physics, Ankara University, Turkey in 1974 and received PhD- degree from Dicle University, Diyarbakir-Turkey. He has studied at Surrey University, Guildford, UK, as a post doctoral research scientist in 1986-1987, and studied on shape memory alloys. He worked as research assistant, 1975-80, at Dicle University and shifted to Firat University, Elazig, Turkey in 1980. He became professor in 1996, and he has already been working as professor. He published over 60 papers in international and national journals; He joined over 100 conferences and symposia in international and national level as participant, invited speaker or keynote speaker with contributions of oral or poster. He served the program chair or conference chair/co-chair in some of these activities. In particular, he joined in last seven years (2014 - 2020) over 60 conferences as Keynote Speaker and Conference Co-Chair organized by different companies.

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Nor Ashidi Mat Isa

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Potential of Clustering Algorithms for Microwave Nondestructive Testing

Clustering algorithms commonly perform data discovery analysis and widely used in various applications such as image segmentation, bioinformatics and text mining. Although of their popularity, very limited work has employed the data clustering approaches for materials evaluation using microwave nondestructive testing. Employing clustering algorithms to discover the hidden patterns of the microwave signals is highly feasible from the perspective of data clustering analysis. Practically, the clustering algorithms can evaluate the degradation of the materials in term of imaging, defect detection and degradation level. In this research, the potential of using the clustering algorithm as microwave nondestructive testing system is comprehensively discussed. Moreover, the challenges, advantages and disadvantages of the potential system are addressed

Biography

Prof. Ir. Dr. Nor Ashidi Mat Isa received the B. Eng. Degree in Electrical and Electronic Engineering with First Class Honors from Universiti Sains Malaysia (USM) in 1999. In 2003, he went on to receive his Ph.D. degree in Electronic Engineering (majoring in Image Processing and Artificial Neural Network). He is currently a Professor and the Deputy Dean (Academic, Career and International) at the School of Electrical and Electronic Engineering, USM. His research interests include intelligent systems, image processing, neural network, biomedical engineering, intelligent diagnostic systems and algorithms.

Li, Wei; Cui, Weicheng

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Design and development of a bioinspired robot that mimics the locomotion of the manta ray and preliminary results of locomotion

Fish swimming is usually fast, efficient, and maneuverable that outperforms the behaviors of various types of underwater submersibles. Batoid fishes, e.g., the manta ray, the cownose ray, and the stingray, use their pectoral fins to produce thrust, with distinct efficiency and maneuverability, and are thus the ideal creatures to imitate for design of the future underwater vehicles. In this presentation, we introduce the preliminary result of the design and development of our bioinspired robot prototype that mimics the locomotion of the manta ray, including the design of the pectoral fins, the main body, and the electronics. The basic locomotion of the pectoral fins is investigated and the preliminary experimental results of the swimming locomotion of the vehicle are provided.

Biography

Weicheng Cui is a Chair professor at Westlake University. He got his Ph.D from University of Bristol, England, in 1990. He was the project leader and first deputy chief designer of Jiaolong deep manned submersible. He has been serving as an editorial board member of six international journals. He has published more than 400 technical papers in various technical journals and conferences. His current interest is to develop robofish-type submersibles.

Wenwu Wang

Signal Processing and Machine Learning, Co-Director Machine Audition Lab within the Centre for Vision Speech and Signal Processing, University of Surrey, UK.

Dictionary Learning and Sparse Signal Recovery for Nonlinear Compressive Measurements

Sparse representations and dictionary learning have been used widely in linear inverse problems, such as denoising, inpainting, deblurring, or super-resolution. However, they have been less explored for nonlinear measurements. In this talk, we present a new method for signal recovery and dictionary learning from nonlinear measurements, such as clipping (also called saturation), and quantization. Different from conventional methods, where recovering a signal from clipped and quantized measurements is often formulated as a constrained optimization problem, we propose a unified framework for signal recovery from clipped, quantized, as well as linear measurements. With a data-fidelity term that promotes consistency with the nonlinear measurement function, we generalize the linear least-squares loss function commonly used in sparse decompositions, and show that under some conditions on the measurement function, the proposed loss is convex, and continuously differentiable with a closed-form gradient, which makes it suitable for a range of optimization algorithms. This allows us to extend classical sparse decomposition algorithms to deal with nonlinear measurements. We then discuss how to learn a dictionary from the nonlinear compressive measurements, and demonstrate its improved performance for signal reconstruction, over the use of fixed dictionaries.

Biography

Wenwu Wang is a Professor in Signal Processing and Machine Learning, and a Co-Director of the Machine Audition Lab within the Centre for Vision Speech and Signal Processing, University of Surrey, UK. He received the B.Sc. degree in 1997, the M.E. degree in 2000, and the Ph.D. degree in 2002, all from the College of Automation, Harbin Engineering University, China. He worked in King's College London (2002-2003), Cardiff University (2004-2005), Tao Group Ltd. (now Antix Labs Ltd.) (2005-2006), Creative Labs (2006-2007), and University of Surrey (since May 2007). He was a Visiting Scholar at Ohio State University, USA, in 2008. His current research interests include blind signal processing, sparse signal processing, audio-visual signal processing, machine learning and perception, artificial intelligence, machine audition (listening), and statistical anomaly detection. He has (co)-authored over 250 publications in these areas.

He has been a (co-)recipient of over 15 awards including the Judge's Award on DCASE 2020, the Reproducible System Award on DCASE 2019 and 2020, Best Student Paper Award on LVA/ICA 2018, the Best Oral Presentation on FSDM 2016, Best Student Paper Award finalists on ICASSP 2019 and LVA/ICA 2010, the TVB Europe Award for Best Achievement in Sound in 2016, and the Best Solution Award on the Dstl Challenge in 2012.

He is a Senior Area Editor for IEEE Transactions on Signal Processing, and an Associate Editor for IEEE/ACM Transactions on Audio Speech and Language Processing. He is a Specialty Editor in Chief for Frontiers in Signal Processing. He is a Member of the IEEE Signal Processing Theory and Methods Technical Committee, IEEE Machine Learning for Signal Processing Technical Committee, and International Steering Committee of Latent Variable Analysis and Signal Separation. He is a Satellite Workshop Co-Chair of INTERSPEECH 2022, Incheon, Korea, and was a Publication Co-Chair for ICASSP 2019, Brighton, UK.

Longzhi Yang

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Fuzzy Rule Interpolation and Real-world Applications

Fuzzy logic is an effective tool for the representation and management of fuzziness or unclear boundaries of concepts. The most widely applied fuzzy system is fuzzy inference which represents and manages the imprecision and incompleteness in commonsense reasoning with high performance and comprehensibility. Fuzzy interpolation further strengths the power of fuzzy inference by: i) reducing system complexity using a compact rule base with the redundant rules expressed by their neighbours, and ii) enhancing the robustness of fuzzy systems to ensure a conclusion can always be generated based on limited knowledge represented in the rule base. Fuzzy interpolation has been further developed to deal with reasoning in a dynamic environment, leading to adaptive fuzzy interpolation. Fuzzy interpolation and its variant have been widely applied to control, robotics, and other real-world applications with competitive performance but acceptable computational costs

Biography

Longzhi Yang has completed his PhD from University of Wales, Aberystwyth, and postdoctoral research from the University of Bradford, UK. He is an Associate Professor and the Director of Education with the Department of Computer and Information at Northumbria University, UK. He is the chair of IEEE SIG Big Data for Cyber Security and Privacy, and IEEE CIS Big Data Task Force. He has published more than 130 peer-reviewed papers and has been serving as an Associate Editor of IEEE ACCESS and PeerJ, and an editorial board member of Expert Systems.

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How the emerging technologies and stock markets came into play with the COVID-19 pandemic: A Range based GARCH approach

This article investigates how the emerging technologies as Robotic and Artificial Intelligence impact stock markets performance and volatility in context of the COVID-19 pandemic. Using the MSCI AC Asia Pacific, MSCI Americas, MSCI Europe, MSCI EM Europe and Middle East and MSCI South Africa indices as proxies for their corresponding stock markets and the NQROBO for the global AI and Robotic, a RANGE based GARCH methodology was applied. The results suggest that the emerging technology environment as global AI and Robotic is more relevant in the COVID-19 pandemic period in capturing returns and volatility persistence of the different stock markets. The contagion of shocks emitted from the emerging technologies to the stock markets are similar in direction, but heterogeneous in magnitude. Europe and South Africa registered the most and Americas the least prominent increase in impact of the emerging technologies. Additionally, the GARCH component increased significantly during the COVID-19 pandemic, indicating that the volatility is more persistent than before. It is the Asia Pacific and Europe stock markets that are most affected by the volatility persistence. From an investor perspective, one important implication is that the stock markets are more exposed to emerging technology as global Robotic and Artificial Intelligence since the COVID-19 pandemic started and that these aspects should be considered by portfolio managers when executing performance evaluation

Biography

Laura holds a BSc Economics from Universidad Autónoma de Baja California, received her Master in Finance from EGADE Business School and is currently studying a PhD in Business at the Universidad de Barcelona, where she is focusing on Innovation within the banking and finance industry. She was Research and Teaching assistant at the School of Economics, Tecnológico de Monterrey and is currently lecturing at the EALDE Business School, courses related to Risk Management. Laura has been professionally involved with firms like Deloitte, MSCI, Bank Sabadell and is currently working on initiatives related to IT Risk and Regulation at CaixaBank.

Kelum A.A. Gamage

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Innovation in Education Through Applied Science Engineering and Technology

Innovation in education through applied science engineering and technology can play a substantial role in preparing the next-generation workforce to address the complex societal challenges of the 21st century. Academics can make a real difference, and it is pivotal to rethink how we teach using the most recent innovative technologies. Similarly, transforming the current landscape of education and supporting the development of pedagogically sound innovative learning environments are also vital to make higher education appealing to future generations. This paper presents the most recent innovative technologies applied in the higher education sector, with a particular focus on the post-COVID-19 landscape for education. It will also investigate the challenges and opportunities associated with the impact of COVID-19 on global Higher Education sector, also view how innovation in education through applied science and technology can create a more secure, stable and resilient space for learning and teaching.

Biography

Kelum A.A. Gamage (BSc, PhD) is an Associate Professor in the School of Engineering at University of Glasgow, UK and holds the position of Visiting Professor at the University of Electronic Science and Technology of China (UESTC) and Sri Lanka Technological Campus (SLTC). His research interests are in radiation detection and instrumentation methods, educational development and innovation, quality assurance and enhancement. He has authored over 120 peer-reviewed technical articles. He is a Chartered Engineer of the Engineering Council (UK), a Senior Fellow of the Higher Education Academy, a Fellow of the IET, a Fellow of Royal Society of Arts and a Senior Member of IEEE.

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Planning complex cybersecurity audits in the Navigation Sector

The Navigation sector will represent on the future one of the biggest economic sectors, and the navigation programs represent currently one of the biggest investments in Europe. According to the European Union Space Policy, the GNSS (Global Navigation Satellites Systems) programs play an important role, and the estimated budget for the space programme, according to the current status of the multiannual financial framework for 2021-2027, is around 14 billion euros in current prices. The cybersecurity is considered as absolutely critical within these programs. The cybersecurity audits are described as the evaluation of the level of compliance of the information security management system and implemented security measures with defined requirements, security policies in place and the appropriate safety standards. The conference will highlight the main challenges to plan these cybersecurity audits and the most relevant lessons learnt at the European Space Agency. The number of interfaces and interdependencies in these systems, the increasing trend in subcontracting parts of the systems and the technical and legal requirements make the process really complex. In this conference, the author will introduce the concept of cybersecurity audits, explain some of the factors that contribute to the complexity of the projects in the space sector along the supply chain, and describe tools that can assist in the audit process to conclude with some recommendations to be taken into account to facilitate the process.

Biography

Dr. Jose Ramon Coz finished his PhD degree in Economy at the Complutense University (Madrid). As well, he finished a second PhD degree in Computer Engineering at the UNED University (Madrid). He holds a M.S in Physics (University of Cantabria), a M.S. in Economics (Complutense University) and several graduate degrees in Telecommunications and Public Management (Polytechnic University of Madrid). He has more than twenty years of experience in the field of auditing and cybersecurity. Currently working as the Head of the cybersecurity audit section at the European Space Agency, and as professor at several institutions and universities.

Ivana Martinović

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Plant extracts as eco friendly corrosion inhibitors

Wide application of metals is due their corrosion stability, which depends on the properties and stability of the passive oxide layer on the metal surface. Passive layer of metals is affected by the media where metals are immersed and its stability depends on many variables, such as temperature, chemical composition and pH of the media. One of the most important methods used for corrosion protection is the addition of inhibitors. However, many commercial inhibitors are toxic and have negative environmental impacts. Plant extracts can be used as green inhibitors due the presence of heterocyclic constituents (phenolic, aromatic compounds, etc.) which are non toxic, easily biodegradable and renewable. The adsorption and corrosion inhibition of extract of mediterranean plant *Helichrysum italicum* on the metal surface (Cu, Fe, Al..,) were investigated by electrochemical techniques. It was found that the adsorption process follows Freundlich adsorption model and the standard Gibbs energy ($\Delta G \approx 15$ kJ mol^{-1}) indicated that the adsorption mechanism of extracts on metal is the physical adsorption. The experimental results showed that inhibition efficiency increases simultaneously with increase of extract concentration. Maximum inhibition efficiency of ~50 % is obtained.

Biography

Ivana Martinović has completed her PhD from Faculty of Science and Education, University of Mostar, Bosnia and Herzegovina. She is associate professor at Department of Chemistry at Faculty of Science and Education. Her scientific research work is in following areas: Corrosion of metals and alloys, Corrosion and environment, Natural products as corrosion inhibitors, Corrosion of bio implants. She has published many papers on these subjects and she participated in several national projects.

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Stability and thermophysical properties of nanofluids for solar applications

In the past decade, the nanofluids used in solar thermal systems have been studied for enhancing the solar collectors' performance and establishing them as viable and highly efficient systems. Research studies about nanofluids are on the rise owing to the mounting interest and demand for nanofluids as heat transfer fluids in a wide variety of applications in recent years. The stability of nanofluids is one key challenge hindering the widespread practical application of nanofluids. Studies showed that stability depends on pH, sonication time, different types of shapes, and sizes of nanoparticles with different base fluids, nanofluid preparation methods, volume fractions, and surfactants and functionalizing.

The incorporation of nanoparticles in the base fluid leads to change in the thermophysical properties such as thermal conductivity, viscosity, and specific heat that affect the convective heat transfer. Several factors affecting the thermophysical properties; including types of nanoparticles, solid volume fraction, different base fluid, stability, temperature, particle size, shape, pH, sonication, and surfactants. There are many contradictory results found in the literature on the influence of effective parameters on thermophysical properties. It has been observed that the thermophysical properties are affected by the mentioned parameters. The recent development in this field indicates that nanofluid application in this thermal system showed promising performance. The proper characterization of nanofluids (with hybrid nanofluids recently) results in more efficient heat transfer fluids than single nanoparticle-based nanofluid. However, more intense research is needed to select proper hybrid nanoparticles, their preparation, characterization, and long-term stability to exploit their full potential.

Biography

Dr. Zafar Said is currently working as an Assistant Professor with the Department of Sustainable Renewable Energy Engineering, University of Sharjah, U.A.E, since 2016. Before that, He worked as a post-doctoral researcher at Masdar Institute, U.A.E. He has a Ph.D. from the University of Malaya (Advanced materials and solar energy, 2014) from Malaysia. He serves as the editor, chair, and member of several technical committees and reviewers of technical journals and conferences. His research achievements include (100 research papers (majority Q1), 2 books/book chapters, 18 conference papers, 1 patent), with an H-index of 31, and a total citations of 2991. He secured more than ~763K AUD in research grants. He was honored with several prestigious awards, as Sharjah Islamic Bank Award for Distinguished Researchers (2017-2018), Faculty Annual Incentive Research Award for 2018-2019