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## Global Scientific Guild Conference

# Abstract Book

# 14th Global Webinar on Applied Science, Engineering and Technology

## November 25-26, 2025

**Conference Chairman**

**Prof. Tomasz Krystofiak**
*Poznan University of Life Sciences*
*Poland*

**Conference Chairperson**

**Prof. J.C. Umavathi**
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| 2nd Global Webinar on Obstetrics and Gynecology | March 25–26, 2026 |

**Dr. Orestis Denis Valianatos**

*Global President and CEO, ATMOS Global Pty Ltd (ATMOS Global™), Australia*

## "ATMOS Global™' s Intelligence Revolution: Quantum AI Shaping Finance and Healthcare in the Age of Intelligence"

ATMOS Global™ is proud to stand at the forefront of the Intelligence Revolution, an era defined by the convergence of quantum computing and artificial intelligence. This keynote explores Quantum AI's transformative impact on two of society's foundational sectors: healthcare and finance.

In healthcare, Quantum AI is catalyzing advancements in precision medicine, drug discovery, genomics, and diagnostics, enabling solutions to complex challenges that once confounded traditional approaches. In finance, Quantum AI empowers organizations to achieve unparalleled capabilities in risk assessment, fraud detection, portfolio optimization, and secure transactions, shaping smarter, safer, and more resilient economic systems.

Drawing upon cutting-edge research and early implementations, this keynote presentation will showcase how Quantum AI is unlocking new levels of insight, efficiency, and adaptability. Attendees will gain a strategic perspective on leveraging these technologies to address industry complexities, drive human wellbeing and economic growth, and lead responsibly in the rapidly evolving Age of Intelligence. The keynote will conclude with a vision for cross-disciplinary collaboration and ethical innovation, ensuring that this intelligence revolution serves the greater good.

## Biography:

Dr Orestis D. Valianatos is the Global President and CEO of ATMOS Global Pty Ltd (ATMOS Global ™), a highly accredited and accomplished professional company director, an astute investor in the capital markets, an established innovator, a role model, a visionary thinker with a diverse portfolio of formal qualifications (BSc, MSc, PhD in Atmospheric Physics, Climate & Sustainability, Master of Business Administration, Professional Doctorate in International Business and Sustainability, Corporate Governance training as a Professional Board Director, and soon a Diploma of Finance), experience, unique insight and influential global perspective across multiple domains including artificial intellignce, leadership, strategy and innovation, sustainability, ESG, climate-tech, thematic and sustainable investing. Entrepreneur and agent of change, he has authored more than 50 ground-breaking international research papers as a subject matter expert working in partnership with senior personnel from government departments, universities and major private clients from the mining, manufacturing and energy & utilities sectors.

**Dr. Amarnath Krishnamoorthy**
*University of the West of Scotland*
*UK*

## Advancing Net-Zero Aviation: Microalgae-Driven $CO_2$ Utilisation and Renewable Jet Fuel Pathways

The transition to low-carbon aviation has intensified the need for alternative energy pathways capable of reducing dependence on fossil-derived jet fuels. Microalgae have emerged as a promising biological resource with the ability to simultaneously mitigate industrial carbon emissions and generate energy-rich biomass suitable for conversion into sustainable aviation fuels (SAFs). By assimilating $CO_2$ through photosynthetic processes, microalgae can accumulate substantial quantities of lipids and hydrocarbons that can be refined into drop-in aviation fuels. This paper explores contemporary advances in microalgal biorefinery approaches, including cultivation enhancement, $CO_2$ delivery optimisation, and photobioreactor design innovations that boost productivity and lipid yield. Updated life-cycle assessments reported in current literature indicate that algal-derived SAFs may cut net greenhouse gas emissions by approximately 60%–70% compared to conventional jet fuel, highlighting their potential role in future decarbonisation strategies. Furthermore, integrating microalgae facilities with industrial flue gas streams is discussed as a pragmatic route to improving system efficiency and scalability. Overall, microalgae-based SAF production presents a practical, circular-economy-aligned pathway for reducing aviation emissions while supporting global progress toward net-zero goals.

## Biography:

Dr. Amarnath Krishnamoorthy is a Lecturer in the School of Computing, Engineering & Physical Sciences at the University of the West of Scotland (UWS). His research focuses on the innovative application of microalgae in sustainable energy systems, particularly in bio-jet fuel production and carbon capture technology. His work aims to address global energy challenges by integrating biological processes with advanced engineering solutions to support net-zero emission targets. Amarnath has delivered invited talks and contributed to research dissemination in areas including algal bioprocessing, green aviation fuels, and bio-resource utilisation. His current research explores the development of scalable microalgal cultivation strategies and biorefinery pathways to enhance lipid productivity for renewable fuel generation. Alongside his research, he teaches engineering management, project management, and technical communication, drawing on real-world industrial examples to enhance student engagement. He is also involved in international teaching and knowledge-exchange collaborations, particularly in China, where he supports curriculum delivery and student research development. Passionate about sustainable technologies and academic mentoring, Amarnath continues to explore new directions in bioenergy innovation while supporting learners to become future-ready engineers and researchers.

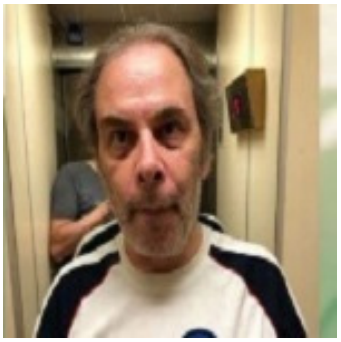
**Prof. J.C. Umavathi**
*Gulbarga University*
*India*

## MHD Couple Stress boundary-layer flow with heat and mass transfer under thermal radiation and Marangoni effect: A Numerical study

This research deals with the investigation of radiative boundary-layer flow of couple stress nanofluids under the Marangoni effect in terms of heat and mass transfer. The approach also takes into account the effects of cross diffusion and magnetic field. Additionally, the study takes into consideration the nanoparticle interfacial layer feature that is taken into account in the nanofluid model. Using similarity transformation, the mathematical issue is transformed to ordinary differential equations, that are then numerically resolved applying the MATLAB solver bvp5c. Utilizing the Response Surface Methodology model the face-centered Central Composite Design, serves as the foundation for the optimization process. The flow fields with nanolayer and without it are compared. For interacting effects, the system's external constraining factors, such as the couple stress parameter, magnetic field, thermal radiation Dufour, Schmidt and Soret effects are investigated. The heat and mass transfer's sensitivity is closely examined. Through graphical representations, the flow fields' embedded dimensionless parameters are investigated. The interfacial layer aspect leads to an enhanced magnitude of the temperature field whereas the effect on the concentration profile is negligible. The inclination of the magnetic field augments the flow profiles significantly. Further the velocity increases near the boundary and then reverses its direction at the free stream for increment in the couple stress characteristic. The temperature and concentration are enhanced for large values of couple stress parameter.

## Biography:

Prof. J.C. Umavathi completed her Post Doctral from the Department of Engineering, University of Sannio, Piazza Roma 21, 82100 Benevento, Italy. She is working as Professor in the Department of mathematics, Gulbarga University since 1993. She has published more than 215 research articles in reputed international journals. She is a recipient of Kalpana Chawla Young Scientist award, Sir J.C. Bose award and Erasmus Mundus Fellowship.



**Dr. Glenn Tony Manuel Barrera**
*Barrera Science Lab*
*Sweden*

## New Efficient Computergraphics HeightMapping and Illumination Algorithm techniques using pseudofunctions

Actually there is still a lot to do when it comes to implementations of CG.

The best example of this is the combined Ultra and Hyper normal illumination and

Automatic (Color Reinforced) Height -Bump-mapping Algorithm.The Bumpmap heights is

here calculated not by using ordinary vector normalization but with an linear ultra -normal, which can increase speed in the range of lowest 1.5 times factor up to several hundreds or even some thousand times speed factor increase, by just replacing square-root and even division and the simple add/subtract arithmetic, by a few addidditions supported by division and/or common multiplication.

### Biography:

Tony Barrera is a certified autodidact math genius. He have published more than 42 Ordinary high rated scientific papers And up to several hundred publications ,computer simulations and animations In different subjects, scientific papers in mathematics , computer graphics, numerical analysis, astrophysics and Particle Atomic physics. Tony does research general together with prof Ewert Bengtsson, Prof Anders Hast and Physicist Bo Thelin and the crew of Barrera Science Lab. Tony Barrera have been working for the company AB Consonant with implementation of the Fast Fourier Transform, FFT , and as a computergrahics researcher at Cycore AB (Webbgraphics). Constructor of about 10 - 20 different Graphics Engines , Assembler ,Basic, Pascal and/or C++ computer languages. Started with mahematics and science at age 3, got the first Astronomy book (from mother Elisabeth Mercadal) at 9, the first Chemistry set at 10 , Chief (head) of Barrera Science Lab.

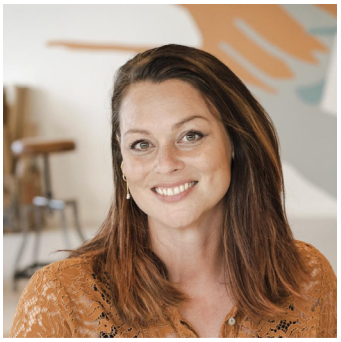
**Prof. Pralay Kumar Karmakar**
*Tezpur University*

# ASTEROSEISMOLOGY WITH QUANTUM CORRECTIONS

The most common states of matter – solid, liquid, and gas – are well known. In contrast, "Plasma" is a unique and wonderful state of matter. It is composed of a statistically large population of Coulombic particles, alongside minor neutrals, exhibiting collective degrees of freedom widely. Its collective dynamics manifest in different forms, such as waves, oscillations, and fluctuations. There indeed exist two distinct types of plasma: (a) Classical (supercritical Debye number, subcritical de Broglie number), and (b) Quantum plasma (subcritical Debye number, supercritical de Broglie number). The normal acoustic (p) modes in degenerate quantum plasmas on the astrocosmic spatiotemporal scales are reasonably distinct from the corresponding non-degenerate classical counterparts. The former is extremely relevant to the seismology of compact astro-objects [1-2], such as the white dwarf family, unlike the latter in ordinary classical Sun-like stars. This presentation offers an orderly overview of astrophysical quantum plasmas and their normal acoustic mode analyses. The considered realistic plasma model consists of classically treated non-degenerate light nuclear species, heavy nuclear species, and quantum-mechanically treated degenerate lighter electronic species. The fluid model closure is guaranteed herein through the gravito-electrostatic (Poisson) coupling actions [2]. A modified spherical mode analysis gives a generalized linear dispersion law. It portrays the nucleus-originated p-modal multiparametric dependency without a usual quasi-classical approximation [3-6]. It is seen that the relative nuclear charge-to-mass coupling parameter plays a destabilizing role on the p-mode. The ratio of the charge density of heavy-to-light nuclear species acts as a stabilizing representative in both the non-relativistic (NR) and ultra-relativistic (UR) regimes. The Coriolis force hosts a destabilizing impact throughout. A comparative evaluation is executed against the existing stability reports [1-2]. The asteroseismic applicability of such acoustic modal portrayals, jointly with essential quantum corrections in various real conditions, is finally outlined.

## Biography:

Prof. Pralay Kumar Karmakar has completed his PhD from Centre of Plasma Physics – Institute for Plasma Research (CPP-IPR), Guwahati, India, under Gauhati University, Assam, India. He has joined Tezpur University as Assistant Professor in the Department of Physics, Tezpur University, Tezpur, India. He has, since then, been widely interested in diversified research and teaching areas, such as Astrophysical plasmas, Cosmic fluid dynamics, Stability analyses of complex media, Nonlinear wave dynamics, Structure formation, Plasma-wall interaction, Gravito-electrostatic sheath, Physics of complex plasmas, Nonlinear plasma theory, Advanced electrodynamics, and so forth. He has successfully completed several awarded research projects, sponsored by Government of India, such as DST, SERB, UGC, etc. He is in the editorial and review board of a number of prestigious international refereed journals. A noteworthy number of active reviewer certificates of honour have been awarded to him. He has good impactful publications in reputed peer-reviewed journals (# 111), book chapters (# 15), proceedings (# 25), etc. He has acted as an invited speaker, keynote speaker, and plenary speaker in a reasonable number of scientific programs both in India and abroad. He has guided a sensibly good number of Research Scholars for PhD, Project Students for Masters, and Interns for Bachelors. He has recently received an award of IUCAA Associateship for executing supported research works in Astronomy in the duration of 2023-26. He is actively associated with several national and international scientific societies of high repute towards promoting science, technology, and academic expansion for mankind globally; and so forth.



**Judith van den Berg- Frijters**
*Breda University of Applied Sciences,*
*Breda The Netherlands*

## Future Literacy: how to shape a sustainable and inclusive future

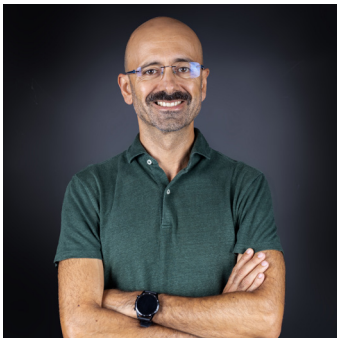
In today's rapidly evolving world, navigating the uncertainty that the future holds, has become a daunting task. To deal with this uncertainty, we must understand it, and that's where Futures Literacy (FL) comes into play. FL is a universal capability, much like reading and writing, that can be developed by everyone. It's a skill that empowers us to understand the role the future plays in our decisions and actions.

UNESCO, the United Nations Educational, Scientific and Cultural Organization, has been promoting Futures Literacy worldwide. They work tirelessly to help individuals and communities understand the future better. After all, imagining possible futures isn't a solitary exercise but a collective endeavor. As a tool, it improves our decision-making, enables us to be adaptable, and fosters an appreciation of diversity. Futures Literacy encourages us to move from unconscious anticipation of the future to a conscious and reflective state.

The future might seem uncertain and overwhelming, but with Futures Literacy, we can learn to understand it, navigate it, and even leverage it. This skill and the mindset it fosters, are not just critical for personal growth but are also essential in our collective journey towards a sustainable and inclusive future. As we continue to face challenges like climate change, pandemics, and social issues, the ability to imagine diverse futures can be our most potent tool. After all, the future isn't something to fear; it's something to shape.

## Biography:

Judith van den Berg has completed her MBA in Business and Social Innovation from the University of Breda in The Netherlands. She has gained more than a decade of experience as a governmental policy advisor, taking on complex social challenges like Youth Participation. The past 5 years she has been working as a Freelance Innovation Professional and is founder of The ChangeUp. In this role she brings multidisciplinary teams together and equips them with skills and tools to boost innovation and creativity. She thrives at challenging the status quo to become resilient and adaptable to this crazy, fast-paced world we live in.



**Prof. Diogo M.F. Santos**
*CeFEMA and Instituto Superior Técnico, ULisboa*
*Portugal*

## Toward Sustainable Water Use in Green Hydrogen Production

Greenhouse gas emissions are driving climate change with increasingly devastating consequences. A rapid energy transition toward a decarbonized society is therefore imperative. Hydrogen, as a clean energy carrier, offers a promising pathway. Power-to-X technologies convert surplus renewable electricity into green hydrogen; however, their high production costs remain a major barrier to replacing fossil fuels. The scientific community is thus striving to develop more efficient and cost-effective water electrolysis systems.

In our group, we have investigated the use of ionic liquids to enhance hydrogen bubble evolution kinetics during water electrolysis, including magnetic ionic liquids that can further improve process efficiency. Yet, large-scale green hydrogen production also raises concerns over water consumption, which must not compete with essential human or agricultural needs.

Seawater electrolysis offers an alternative, but desalination increases costs, and direct seawater electrolysis is still in its early stages of development. Wastewater electrolysis is emerging as a viable and sustainable option for hydrogen generation, while other approaches explore biomass-based solutions to facilitate anodic reactions.

This presentation will discuss the principles and technological advances underpinning the energy transition, with a particular focus on sustainable water management in green hydrogen production.

## Biography:

Diogo M.F. Santos is a Principal Researcher at CeFEMA and an Invited Assistant Professor at Instituto Superior Técnico (ULisboa, Portugal). He studies electrodes and membranes for fuel cells and electrolyzers. D.M.F. Santos has authored over 200 publications; his current h index is 41. He has been listed since 2020 on Stanford University's "World's Top 2% Scientists list." His research interests are related to electrochemical energy conversion and storage.

**Prof. Dr. Virendra Kumar Goswami**
*Indian Institute of Technology & Formerly Univ. of Wisconsin& Univ. of Illinois, USA*

# Role of Physicochemical and spectroscopic methods to characterize the in-situ chemical speciation of the inorganic contaminants for Remediation of Water Pollution, and Global Warming through the Catalytic Oxidants and 'Predictive Model of Chemical Reaction Kinetics (PM-CRK)'

In the present investigations the efforts are focused to develop physicochemical and spectroscopic methods to characterize the in-situ chemical speciation of the inorganic contaminants and develop Predictive Model of Chemical Reaction Kinetics (PM-CRK) for remediation of water pollution by catalytic oxidants. The Oxidation process would be employed to treat Groundwater contaminants by making use of the chemical oxidant s viz. hydrogen peroxide, persulfate, permanganate & ozone. These oxidants have been able to cause the rapid and complete chemical destruction of many toxic organic chemicals; other organics are amenable to partial degradation as an aid to subsequent bioremediation. Water gets polluted due to toxins & toxic gases. There are generally four types of toxic entities: chemical, biological, physical and radiation. Chemical toxicants include inorganic substances such as, lead, mercury, hydrofluoric acid, and chlorine gas, and organic compounds such as methyl alcohol. Hence, the focus is to develop innovative methods to entrap toxins, by developing High Affinity Toxin Receptors (HART), converting GHG (Methane) to ethanol by catalytic processes and develop hybrid fuels like bioethanol and biodiesel and go for electricity from biomass. It's presumed that catalytic oxides of first row transition metal oxides e.g. Cobalt oxide should optimize the process of subsurface remediation and above-ground water treatment systems depending on a variety of site-specific conditions e.g. reaction rate kinetics. Chemical oxidation be applied in subsurface systems and in above ground water treatment systems involving chemical oxidation regeneration of granular activated carbon (GAC). Also, to correlate Physicochemical properties of these catalytic oxides of first row transition metal oxides, to discuss strategies to control Global Warming and remediation of Water pollution re-

sulting due to toxin, toxic gases, GHG (Green House Gases), in order to save marine life (under water). Next, to evaluate correlation of chemical oxidants with chemical species associated with soil, aquifer materials, and contaminants during water treatment processes to develop Correlational 'Predictive Model of Chemical Reaction Kinetics (PM-CRK)' to investigate process fundamentals and assess contaminant transformation.

KEY WORDS: High Affinity Toxin Receptors (HART), Granular Activated Carbon (GAC), reaction rate kinetics, catalytic oxides, Global Warming, Water & Environmental pollution, 'Predictive model of Chemical Reaction Kinetics (PMCRK)'..

## Biography:

Dr. Virendra Kumar Goswami, Ph.D. Indian Institute of Technology (IIT), Kharagpur, M.Sc. Sagar Univ., MS from the University of Wisconsin, USA. Post Doctorate Fellow (PDF) at the University of Illinois, Chicago, USA. 'Visiting Scientist' to United Nations Industrial Development Organization (UNIDO), ICTP, Italy. Expert Panelist International Civil Aviation Organization (ICAO), Canada, and the United Nations. Founder President' of Environment & Peace Foundation & Wing Commander (Retd.) with more than 550 hours of flying as a supernumerary Aircrew. 'Distinguished Alumnus Awardee-2023', IIT Kharagpur & Member: Peer-Review-Committee for the selection of the Distinguished Alumnus Award-2024&2025. Dr. Virendra Goswami worked at Space Science Engineering Centre, NASA NOAA (National Oceanic Atmospheric Administration) at the University of Wisconsin, USA. Former Vice Chancellor: Sangam & Sunrise Universities. Had been, Director General of Management Institutes and director of Engineering Institutes as well as Vice-President of Havells India Ltd. Special Invitee by the World Meteorological Organization (WMO) of the United Nations, Geneva in 2001. Expert Panelist of Association of Indian Universities (AIU) & Ph. D & M. Tech Examiner at Centre of Energy Studies at IIT Delhi. More than 44 years of teaching, research, and administrative experience at Home and Abroad. Also, Member: American Geophysical Union) SCB, AMS & IMS. Lately, appointed Reviewer /Member of the Editorial Board of the Royal Meteorological Society (R. Met. S), Atmospheric Science Letters (R. Met. SAL) as well as Prof.Emeritus: GNEC-Maulana Azad Medical College, Sharda University, Greater Noida, and RVIT, India. Presented Research Papers(275),Authored-Edited Books(14),Patents(6), in the fields of Chemical Technology, Atmospheric, Space Sciences, Health Sciences. Artificial Intelligence and Quantum Computing , Satellite Application, Climate Variability, control of Global Warming, Monsoon Meteorology and quality Higher Education at International and National Conferences held in India, the USA, the UK Latin America, South Africa, Canada, and Europe (more than 35 countries of all the Continents). Besides, headed various delegations at the Natl. & International Levels. Special Invitee on Apr'15 at NSF, NPW: NCAR USA. Invited Speaker to the Coupled Data Assimilation Workshop, sponsored by Météo-France, WMO, and US: CLIVAR & Invited Speaker at Lomonosov Moscow State University (MSU), Sep17.Chaired the session and guest Speaker at International Conf. on Défense & Space Application (ICDSA), AK Technical Univ,22-25 Aug'19& Chief Guest on 24 Feb'20 at AMU. Lately, Chaired Sessions/Invited Keynote Speaker in the WEBINARS: AGU-Oceanography-20-USA; WEB-EPF-IIT- Pollution-Aug'20; SOLAS- PICES,26OCT'20, Globalistic-20-LMSU-Russia, Euro-Marine 2021, CG13 Climate Change, Canada,08Apr'21, Hi-Tech, Météo-France 16 Apr21, CLIVAR-TPON-

24May21, CTBT(SnT20) INDICO, Jun'21, WEB-EPF-BRAUSS-Climate Change 14Aug21, WEB-EPF-BRAUSS-Prakriti-FINLAND Met. Inst, Internal Air Quality 02Sep'21, ICTP-CLIVAR15-17AUG'22, WAC2023,24&25 and USRA-2022-2025 Lunar Science.

**Prof. Tomasz Krystofiak**
*Poznan University of Life Sciences, Poland*

## Epoxy decorative resin for wood industry

Epoxy resin has been used for many years for gluing different materials, e.g. metal, plastic, composites, glass, stone, and wood. In the last years are popular decorative epoxy resins. They can be used both as a bonding or as a finishing material.

In this presentation, properties of epoxy formulation have been presented. Advantages, disadvantages, and opportunities for use in the different industries were shown.

Based on students' diploma works (made on PULS in the Laboratory of Gluing and Finishing of Surface), some opportunities for the use of epoxy resins were presented. Some results of the aesthetic-decorative were shown. In some cases, decorative epoxy resin improved the gloss level of surfaces to a high gloss. The addition of some pigments gave a higher design of coatings. Based on transparency measurements, it was stated that wood-decorative epoxy composites (instead of glass) can be widely used for the production of different parts of furniture. The composition with different colours significantly improves the visual quality of the surface and will be interesting as a solution for individual customers. This is a very important recommendation for practice.

Obtained finishes should be analyzed with the use of special equipment for surfaces. It will the next step of our team research.

## Biography:

Tomasz Krystofiak in 1994 finished the study at the Faculty of Wood Technology at Agricultural Academy in Poznan. In 2002, he prepared a PhD dissertation and in 2019 habilitation. Author or co-author of more than 320 scientific publications in the scope of gluing and finishing of wood and wood-based composites. To his research activities belong surface phenomena, wettability, adhesion and adherence, modification, gluability, and paintability of lignocellulosic materials. He was a Man¬agement Committee Member of COST Actions FP1006, CA15216, CA 21159, and a Working Group Member (FP1303, FP1407). Since 2021, Guest Editor in Special Issues in Coatings, Energies, Forests, and Materials Journals.

**Dr. S. BALAKRISHNAN**
*Aarupadai Veedu Institute of Technology (AVIT)*
*India*

## AI-Powered Digital Twins: Transforming Engineering Design & Predictive Maintenance

The rapid convergence of Artificial Intelligence (AI), Internet of Things (IoT), and advanced simulation technologies has given rise to Digital Twins—virtual replicas of physical systems that enable real-time monitoring, analysis, and optimization. This keynote explores how AI-powered digital twins are revolutionizing engineering design by enabling rapid prototyping, design iteration, and performance prediction with unprecedented accuracy. By leveraging machine learning, predictive analytics, and data-driven modeling, digital twins can anticipate failures, optimize resource utilization, and enhance decision-making in complex engineering environments. The session will highlight key case studies from manufacturing, energy, transportation, and smart infrastructure to demonstrate how AI-driven insights are redefining predictive maintenance, reducing downtime, and extending asset lifecycles. We will also discuss the challenges of implementation—such as data integration, cybersecurity, and scalability—and outline future trends, including autonomous optimization and AI-enabled self-healing systems. Ultimately, AI-powered digital twins represent a paradigm shift, bridging the physical and digital worlds to create smarter, safer, and more sustainable engineering solutions.

## Biography:

Dr.S.Balakrishnan is a Professor and Head of Department of Computer Science and Engineering, Aarupadai Veedu Institute of Technology, Vinayaka Mission's Research Foundation (Deemed to be University), Paiyanoor, Chennai. He has 23 years of experience in teaching, research and administration. He has published over 39 books, 10 Book Chapters, 30 Technical articles in CSI Communications Magazine, 27 technical Blogs, 1 article in Electronics for You (EFY) magazine, 20 articles in Open Source for You Magazine and over 150+ publications in highly cited Journals and Conferences. He has completed 2 funded projects under DST TIDE and CSRI scheme in AI applications. Some of his professional awards include: Iconic Teacher in Research Award at Symbiosis University of Applied Sciences, Indore, Best Patent Award from IEEE Madras Section for the year 2024, Certificate of Award with cash prize $250 for 1st place in the International Poster Challenger by Peeref, Kalpa Acharya Award (Best researcher Award) Bharath Education Excellence Awards (BEEA) 2021-22 organized by BrainOVision, IEEE MAS Best Researcher Award - 2022 (Age 40 and Below 50) by IEEE Madras Section, AICTE Lilavati Award 2021-22 winner with 1 Lakh Cash Prize, Best Performer in the Poster Display at IIC Regional Meet held at Sathyabama Institute of Science and Technology Chennai on 21st July 2022, Best Model/Technology Presentation Award by IEEE-Nanotechnology Council Student Chapter IIT Indore, Yuva Mentor as a Changemaker Award, Faculty with Maximum Publishing in CSI Communications 2017-2019, International Data Science Writer of the Year 2019 by Data Science Foundation UK with cash prize €900, MTC Global Outstanding Researcher Award, Inspiring Authors of India, Deloitte Innovation Award Deloitte for Smart India Hackathon 2018, Patent Published Award, and Impactful Author of the Year 2017-18. He acted as a Mentor, Evaluator cum Jury Panel Member, Grand finale of SIH 2022 and MANTHAN, Mentor and Jury member in ASEAN-India Hackathon 2021, Primary SPOC and Evaluator for Toycathon 2021. He has received an appreciation certificate for Developing SIH Alumni Portal and SIH 2022 Portal for Ministry of Education's Innovation Cell by Ministry of Human Resource Development, Government of India and MHRD's Innovation Cell 25th May 2022. He has delivered 85+ guest lectures/seminars in National & International levels, delivered 20+ keynote speech/invited speech and chaired 350+ sessions for various National and International Conferences. He is serving as a Reviewer and Editorial Board Member of many reputed Journals and acted as Technical Program Committee member of National conferences and International Conferences at Vietnam, China, America and Bangkok. His research interests are Artificial Intelligence, Cloud Computing and IoT. He has delivered various guest lecture under AI applications in power grid applications. Dr.Balakrishnan has acted as mentor in prestigious IndiaAI Fellowship under the IndiaAI Mission! with a fellowship grant of ₹1,00,000. And he has acted as Mentor in Kavach 2023 Hackathon Title Winner with 1 Lakh Cash Prize, Mentor in Smart India Hackathon (SIH) 2020 Title Winner with 1 Lakh Cash Prize. He has 11 Granted International Patents, 42 Indian Patents on IoT Applications, 20 Design Patent Grants and 3 granted Copyrights. Dr. Balakrishnan has been appreciated under India Book of Records 2021 for filing 18 patents over a period of 15 months. He is acting as an Author at IEEE Teaching Excellence Hub, IEEE EduMentor Connect Program mentor, IEEE YESISI'12 2023 Publicity Ambassador, IEEE.TV Region 10 Global Ambassador, IEEE Brand Ambassador, IEEE Publicity Ambassador, IEEE Senior Member, T4 Ambassador and Bentham Science Publisher Brand Ambassador.

**Dr. Seongwoo Woo**
*Ethiopia Technical University, Ethiopia*

## Improving the Fatigue Design of Mechanical Systems such as Refrigerator

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

## Biography:

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

**Prof. Ramachandran Muthiah**
*Morning star hospital,*
*India*

## Terahertz Science and Technology in brain sciences

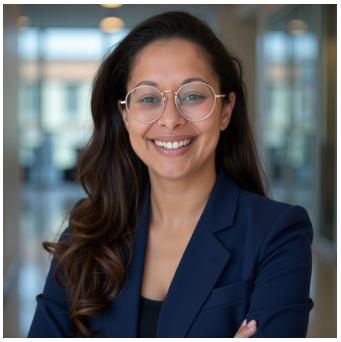
Terahertz (THz) radiation refers to electromagnetic waves ranging from 100 GHz to 10 THz, corresponding to wavelengths between 3 mm and 3 μm, sandwiched between the millimeter wave and the middle infrared band. It features a short wavelength, high penetration in the dust, and low photon energy with no ionization damage. It is also a band rich in characteristic fingerprints of molecular vibrations and rotations, with important applications in various fields . However, the THz band is traditionally called the "terahertz gap" because generating and detecting the THz wave has been difficult. With the advancement of the generation of the THz wave , THz applications in other fields like high-speed communications , atmospheric remote sensing , security imaging , and bio-sensing have begun to be applied in the real world. THz wave-based physical regulation leverages the unique physical properties of THz waves to influence the structures and functions of biological macromolecules and ultimately achieve desired physiological functionalities. It attracts increasing attention due to nonthermal, noninvasive, and reversible modulation manners, showing great potential in biomedicine and brain sciences.

Ion channels, as critical pore proteins being awarded Nobel Prizes 3 times (years 1991, 2003, and 2021), are undoubtedly essential for biological systems. Understanding ion permeation and successfully regulating it is the key to developing new therapeutic strategies for channelopathies or achieving desired neuronal activities. THz wave manipulation of DNA and RNA is likely a promising tool in genetic engineering. In the realm of RNA research, different THz waves have shown the ability to either promote the mechanical unfolding or alter the structure stability of RNA hairpins in different unfolding phases. Receptor–ligand recognition based on interactions like ionic bonds, hydrogen bonds, van der waals forces, and hydrophobic interactions underpins myriad physiological processes, making receptors the drug targets for therapeutic intervention. To address

the severe side effects induced by potent but high-affinity antipsychotic drugs, Li et al proposed to significantly accelerate drug dissociation by diminishing the hydrogen bonding and stacking forces between the receptor and drug with specific THz irradiation. Peptide aggregation, particularly that of amyloid-β (Aβ) peptides, is an essential hallmark for neurodegenerative diseases like Alzheimer's. Since THz radiation showed superiority of modulating the intermolecular interactions, it rapidly became an alternative to regulate peptide aggregation. Phospholipids form the basis of cell membranes that regulate the exchange of substances between the cell and its environment. The dielectric dispersion and spectral characteristics of phospholipid bilayers were sketched in the THz band , underscoring the potential of THz waves to manipulate membrane functioning, which might be conducive to drug delivery. Specifically, the biological responses of primary hippocampal neurons to THz radiation were investigated regarding varying power densities . The role in modulating neural signaling was further emphasized where THz radiation was proved capable of promoting synaptic plasticity by activating the nuclear factor κB (NF-κB) pathway , enhancing synaptic transmission and cell differentiation in vitro , and promoting growth and signaling of neurons . The transcriptome study showed the influence of THz illuminance on cell proliferation and migration.

## Biography:

Ramachandran Muthiah, Consultant Physician & Cardiologist, Zion hospital, Azhagiamandapam and Morning star hospital, Marthandam, Kanyakumari District, India. Completed MBBS in 1989 under Madurai Kamaraj University, M.D. in General Medicine in 1996, D.M. in cardiology in 2003 under Tamil Nadu Dr.MGR Medical University, Chennai, India. Worked as medical officer in Rural health services for 5 years and in teaching category as Assistant Professor at Madras medical college, Coimbatore medical college, Thoothukudi medical college and Professor at Dr.SMCSI Mission hospital & Medical college, Karakonam, Trovandrum and Azeezia Medical college, Kollam. Published many papers in Cardiosource, American College of Cardiology Foundation, Case Reports in Clinical Medicine (SCIRP) and Journal of Saudi Heart Association. Special research on Rheumatic fever and Endomyocardial fibrosis in tropical belts, Myxomas, Ineffective endocarditis, apical hypertrophic cardiomyopathy, Ebstein's anomaly, Rheumatic Taussig-Bing Heart, Costello syndrome and Tetralogy of Fallot and brain abscess.



**Mrs. Nia Luckey**
*AT&T., USA*

## Trust, Artificial Intelligence, and Risk in the Digital Age

Artificial intelligence is now inseparable from our economic, political, and social systems, yet our trust in these systems is eroding just as their influence deepens. Trust, Intelligence, and Risk in the Digital Age explores the convergence of AI, cybersecurity, and human confidence in technology through a strategic lens. Drawing from real-world case studies and original quantitative research, this session reveals how organizations can measure, manage, and rebuild digital trust at scale. Attendees will learn how to operationalize frameworks such as FAIR for risk quantification, implement AI trust architectures that embed transparency and accountability, and design governance models that evolve as fast as the threats they face. By bridging behavioral science, cyber resilience, and machine intelligence, this talk offers a roadmap for leaders seeking to transform uncertainty into measurable assurance and to build systems worthy of the trust they demand.

### Biography:

Nia Luckey is a cybersecurity risk executive at AT&T, an author, and a TEDx speaker recognized for her strategic acumen in governance, risk, and compliance. A co-author of The CISO Playbook, she blends technical expertise with leadership insight to drive digital resilience and trust transformation across complex enterprises. Drawing on her military background and executive experience, Luckey is a global voice on the intersection of trust, technology, and human behavior, and an advocate for inclusive pathways into the cybersecurity field.

**Dr. Farah Jemili**
*University of Sousse,*
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## Generative Artificial Intelligence for Cyber Security

In the face of escalating cyber threats, the fusion of artificial intelligence (AI) with cybersecurity strategies has become a cornerstone for modern defense systems. This presentation, delivered by Dr. Farah Jemili, explores the pivotal role of generative AI in fortifying cybersecurity frameworks. As modern communication technologies generate vast amounts of data daily, the presentation addresses the pressing need to harness this data to safeguard Industry 4.0 infrastructures, which are increasingly vulnerable to cyber-attacks. With cyber-attack damages projected to reach $8 trillion in 2024 and escalate to $10.5 trillion by 2025, innovative solutions are essential.

The presentation outlines the current cybersecurity landscape, identifying key challenges such as data collection, storage, processing, and the accurate detection of cyber threats. It emphasizes the transformative potential of AI methodologies, including machine learning, deep learning, and generative learning, in developing robust intrusion detection systems and real-time threat response mechanisms.

A detailed examination of real-world AI applications in cybersecurity is provided, showcasing technologies like Cylance for malware prevention, AEG for automatic exploit generation, AI2 for predictive threat analysis, and IBM's Watson for IoT network analytics. The comparative study of various deep learning models highlights their distinct advantages and limitations in cybersecurity contexts.

Furthermore, the presentation discusses the integration of AI with other technological pillars such as cloud computing and big data, illustrating how these synergies enhance cybersecurity capabilities. The research contributes to understanding how AI can be leveraged to develop intelligent, adaptive, and resilient cybersecurity systems, ultimately

aiming to mitigate the risks and impacts of cyber-attacks.

The presentation concludes with perspectives on future research directions and the evolving landscape of AI in cybersecurity, underscoring the critical role of continuous innovation and collaboration in this domain..

## Biography:

Farah JEMILI is an Associate Professor at the Higher Institute of Computer Science and Communication Technologies of Sousse (ISITCOM), Tunisia. She has completed her Ph.D. in 2010, from the National School of Computer Sciences (ENSI), Tunisia. She is a Scientific Referent at the Tunisian Agency of Evaluation and Accreditation (ATEA), and Internship Director at ISITCOM. She has been member of the Scientific Council of ISITCOM for 3 years (2011-2014), and Head of the Department of Computer Science at ISITCOM for 3 years (2017-2020). Her research interests include Artificial Intelligence, Cyber Security and Big Data Analysis. She served as a Reviewer for many international conferences and journals. She has published around 60 Research papers in international journals and conferences and has presented many invited and contributed Talks at international conferences.

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