FOREWORD

Dear Colleagues,

It is our pleasure to invite all scientists, academicians, young researchers, business delegates, and students from all over the world to attend the 2nd International Meet on Applied Science, Engineering and Technology (ASETMEET2023), August 14-16, 2023, Vancouver, Canada.

ASETMEET2023 shares an insight into the recent research and cutting-edge technologies, which gains immense interest with the colossal and exuberant presence of young and brilliant researchers, business delegates, and talented student communities.

ASETMEET2023 goal is to bring together, a multi-disciplinary group of scientists from all over the world to present and exchange breakthrough ideas relating to Applied Science, Engineering and Technology.

It promotes top-level research and globalizes the quality of research in general, thus making discussions and presentations more internationally competitive and focusing attention on the recent outstanding achievements in the field of Applied Science, Engineering and Technology.

We’re looking forward to an excellent meeting with scientists from different countries around the world and sharing new and exciting results in Applied Science, Engineering and Technology.
### COMMITTEES

#### Organizing Committee

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Plenary Abstracts
Hurricane Hazards and Risk in a Changing Climate

Ning Lin*
Department of Civil and Environmental Engineering, Princeton University

Abstract
Hurricanes cause much damage and loss of life worldwide. The impacts of these storms may worsen in the coming decades because of rapid coastal development coupled with sea-level rise and possibly increasing hurricane activity due to climate change. Here we present a holistic framework of modeling hurricane hazards and risk in a changing climate. First, we introduce a new probabilistic hurricane model that can be used to generate large numbers of synthetic storms with physically correlated characteristics under projected climate conditions. Second, we discuss about hurricane wind, rainfall, and surge hazard modeling and the coupling with the hurricane model to estimate individual and compound hazard probabilities in a changing climate. Then, we discuss about the modeling of hurricane impact on infrastructure systems, particularly hurricane-blackout-heatwave compound risk.

Biography
Ning Lin is an Associate Professor of Civil and Environmental Engineering at Princeton University. Lin’s research areas include natural hazards and risk analysis, climate change impact and adaptation, wind engineering, and coastal engineering. Her current primary focus is hurricane risk analysis. She integrates science, engineering, and policy to study hurricane-related weather extremes, how they change with changing climate, and how their impact on society can be better mitigated. She has published in high-impact journals including Science, Nature Climate Change, and PNAS on these topics. Lin is a recipient of CAREER award from National Science Foundation (NSF), Natural Hazards Early Career Award and Global Environmental Change Early Career Award from American Geophysical Union (AGU), and Huber Research Prize from American Society of Civil Engineers (ASCE). Lin received her Ph.D. in Civil and Environmental Engineering from Princeton University in 2010. She also received a certificate in Science, Technology and Environmental Policy in 2010 from Princeton. Before rejoining Princeton as an assistant professor in 2012, she conducted research in the Department of Earth, Atmospheric and Planetary Sciences at MIT as a NOAA Climate and Global Change Postdoctoral Fellow.
Keynote Abstracts
Stereolithographic Additive Manufacturing of Solid Components with Practical Functions

Soshu Kirihara
Joining and Welding Research Institute, Osaka University, Japan

Abstract
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 the 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 obtain thixotropic slurry. The resin paste was spread on a glass substrate with 50 μm in layer thickness by a mechanically moved knife edge. An ultraviolet laser beam of 355 nm in wavelength was adjusted to 50 μm in variable diameter and scanned on the spread resin surface. Irradiation power was automatically changed for an adequate 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. Through computer-aided smart manufacturing, design, and evaluation (Smart MADE), practical material components were fabricated to modulate energy and material transfers in potential fields between human societies and natural environments as active contributions to Sustainable Development 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 as Sustainable Geoengineering” for environmental modifications and resource circulations, 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.
Next generation of Ed Tech - Synchronous Hybrid Learning Desk Console in eLearning

Tris Kee*
The University of Hong Kong, Hong Kong

Abstract
Covid-19 pandemic has drastically transformed the way students learn and how teachers teach globally. Research has indicated that universities and educational technologies companies find it challenging to support synchronous hybrid collaborative group work or discussion due to the limitation of technology. The default practice is usually to separate the virtual group from the physical group in breakouts leading to limited peer interactions and opportunities for learning. Many classroom settings are limited with the fixed desk arrangement, and students who bring their laptop or devices often find it difficult to find an electric plug to recharge. At the University of Hong Kong, a team of academic inventors has worked with to innovate a technology entitled Synchronous Hybrid Learning Mobile Desk Console to solve the problems.

The research and invention were underpinned by the global need to facilitate dual-mode learning and this innovation developed by HKU has helped create a flexible, dialogic and interactive teaching and learning configurations in the classroom. As a result, many HKU faculties as well as local secondary schools have expressed interest in learning more about the potential for allowing both physical and virtual group collaboration seamlessly in a synchronous hybrid learning environment. This device is conducive to the new pedagogical approach of the learning environment in encouraging collaborative online digital learning. In addition, the team has successfully obtained a Design Patent in China and Hong Kong on this particular innovative teaching product that has the potential to influence how classroom can operate in a synchronous hybrid mode.

Biography
A graduate of the School of Architecture, University of Waterloo, Canada, Tris worked in Rome, Amsterdam, London and Vancouver before returning to Hong Kong. She has been awarded a broad range of academic research projects including urban revitalization schemes, district aspiration studies, waterfront planning research, sustainable development, heritage conservation and public engagements. In all of her work, Tris advocates an active approach
to engaging community participation in the architecture and design. Tris’ work received the Royal Architectural Institute of Canada Roll of Honour, the Ontario Association of Architects’ Guild Medal, and an Outstanding Thesis Award in 2002. She is a recipient of the ‘40 under 40 Architectural Design Award’, a Green Building Award 2012 from the Hong Kong Green Building Council and the The Hong Kong Education Leadership Award 2019 by the Asian Confederation of Businesses. She was one of the curators for the 2012 Hong Kong / Shenzhen Bi-City Biennale for Urbanism and Architecture and an exhibitor for the 13th Architecture Biennale in Venice. She has published a number of architecture books, including Sustainable Revitalization (ISBN 9789881602015), WE OWN THE CITY (ISBN 9789078088912), and contributed to The Towers of Choices by Winy Mass and NAI (ISBN 9789462083745), Hong Kong –Barcelona Urban Exchange (ISBN 9789881693006) and Building Materials and Technology in Hong Kong (2018) (ISBN 9789888390984).
Nonlinear Integro- Differential Equations with Delay: Solution Estimates and Stability

**Sandra Pinelas**
Departamento de Ciências Exatas e Engenharia, Academia Militar, Av. Conde Castro Guimarães, Amadora, Portugal

**Abstract**
Covid-19 pandemic has drastically transformed the way students learn and how teachers teach globally. Research has indicated that universities and educational technologies companies find it challenging to support synchronous hybrid collaborative group work or discussion due to the limitation of technology. The default practice is usually to separate the virtual group from the physical group in breakouts leading to limited peer interactions and opportunities for learning. This device is conducive to the new pedagogical approach of the learning environment in encouraging collaborative online digital learning. In addition, the team has successfully obtained a Design Patent in China and Hong Kong on this particular innovative teaching product that has the potential to influence how classroom can operate in a synchronous hybrid mode.

**Keywords**
Ordinary Differential Equations; Delay; Integro-differential Delay Equation; Eualitative Properties.

**Biography**
Sandra Pinelas is working as a professor in Military Academy and In 1995 December – 1999 March she is worked as a Assistant in Évora University. 1999 March – 2007 January, Assistant in Azores University and as a professor till 2007 April. Education and academic qualifications are completed her Ph.D. in 2007 in Mathematic Analysis at the Azores University and Msc in 1997 in Mathematic at the Évora University. In 1995 Graduation was completed in Mathematical Analysis at the Évora University. Professional Activities as Visiting Professor, During 2006, September, Munich University of Tecnology (Munique, Germany) and In 2009, February - March, Florida Institut of Tecnology (Melbourne, Florida, EUA) and In 2010, February – March, Florida Institut of Tecnology (Melbourne, Florida, EUA). Professional Activities as Visiting Professor
Invited Abstracts
Challenges of European Regenerative Agriculture: modern Information Monitoring Systems

Neményi, M.*
Department of Biosystems and Precision Technologies, Albert Kázmer Agricultural Faculty, Széchenyi István University, Vár tér 2., Mosonmagyaróvár, Hungary

Abstract
By 2050, the Earth's population is projected to approach 10 billion from the current 8 billion. Providing this population with high-quality food (primus inter pare) while meeting sustainable ecological expectations poses a challenge. The goals are to regenerate the soil, maintain yields, increase biodiversity and engage in profitable activities. However, based on current knowledge, achieving these expectations on a wide scale appears paradoxical and somewhat illusory. Ecological farming may lead to a 20-30% decrease in yields and an increase in ecological footprint per unit of product. Nevertheless, it is true that ecological farming allows for significantly lower toxicity indexes. The EU has currently set expectations for ecological farming with deadlines set for 2030 and 2050. Regenerative technologies demand even stricter requirements, such as a complete ban on synthetic pesticides and fertilizers [1, 2, 3, 4]. The presentation aims to approach the problem from an ICT perspective [5].
So far, we have collected a few hundred data points from a 50-100 hectares field divided into management zones based on the principles of precision technology. In modern solutions, the available database consists of several million data points [6, 7]. The combination of Wireless Sensor Networks (WSN) and artificial intelligence – based Internet of Things (IoT) has revolutionized precision farming. WSN enables continuous data collection from the production unit and its nearby and distant natural and environmental surroundings, significantly improving forecasting efficiency. Data can be collected using a unified system, compared with each other and responses can also be made with a unified approach.
Artificial intelligence plays a role not only in decision preparation but also in decision-making (Machine-to-Machine – M2M). The conflicting expectations of food security and ecological sustainability can only be realized through this method. The further development of the Mosonmagyaróvár Agro- IoT system means that data-collecting robots move among the installed sensor stations [8]. These small-sized, autonomous, swarm-operated vehicles equipped with artificial intelligence interfaces with sensors for measuring the physical and chemical characteristics of the soil, detecting pathogens, pests and disease symptoms, analyzing
weed growth and diversity. Moreover, it may also have microclimate sensors, electronic noses, electronic tongues, and the ability to measure gases emitted by the soil. By complementing the database provided by the above-mentioned system with satellite and drone data, a paradigm shift can occur in the field of Ecological Information and Communication Technology (EICT). Humanity needs to understand nature much better in order to protect it. The goal is to create the coexistence of the natural and agricultural environment, for which we currently have little knowledge. The new A-IoT (Agro -Internet of Things) at our university represents a paradigm shift not only in data collection and intervention but also in understanding the relationship between nature and the two systems together. The Soil-to-Fork system ensures the “transparency” of the entire production chain based on IoT. The processing of databases provided by IoT using artificial intelligence can contribute to the development of consumers' ecological intelligence.

**Keywords:**
Regenerative agriculture; Internet of Things; Wireless Sensor Network; Small-smart data logger robots

**Biography**
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4 Neményi Thoughts on the Strategy for Regenerative Agriculture in Europe and the Conditions for Achieving the Objectives. Digitization Paradigm Shift in Agriculture (In Hungarian), Magyar tudomány, 2022, 10.
Properties and Its Effect on Maize Yields within Field—A Case Study in Hungary. Agronomy 2022, 12,


Biomimetic Slippery Oleogel Surfaces for Sustainable Drag Reduction of Marine Vehicles

Sang Joon Lee*
Dept. of Mechanical Engineering, Pohang Univ. of Science and Tech. (POSTECH), Pohang 37673. Republic of Korea

Abstract
Liquid-repellent surfaces have wide engineering applications, including drag reduction, anti-fouling, anti-icing, etc. For effective drag reduction, lubricant-infused surface (LIS) which impregnates a lubricant in the void spaces of the surface, inspired by the micro/nano structures of Nepenthes alata, was introduced. However, LIS surfaces usually lose the entrapped air or infused lubricant by flow-induced shear stress. Thus, they hardly sustain drag reduction performance under high-pressure and/or high-speed flow conditions. In this study, we developed a slippery erucamide-PDMS (EPC) oleogel surface by cross-linking erucamide with PDMS gel network and then infusing silicon oil as a lubricant. Erucamide is a kind of fat-acid amide, a main component of mucus of marine creatures. Oil molecules are stably dispersed in the network of cross-linked EPC chains to protect their depletion from the surface. The fabricated EPC-oleogel surface has very small values of 0.3° in contact angle hysteresis and sliding angle. The surface also exhibits excellent slippery properties under harsh conditions of high pressure, high temperature and high-speed shear flows. The EPC-oleogel surface has shear-stable drag reduction performance of 12-16% up to high-speed of 12m/s. This high drag reduction at high-speed turbulent flows is not easy to achieve for conventional LIS surfaces. In addition, the oleogel surface did not attach bio-foulants under real marine environment for more than 4 months, demonstrating excellent anti-biofouling property. The lubricant oil impregnated in the slippery oleogel surface allows self-replenishment to sustain the excellent drag reduction and anti-fouling capacities under harsh flow conditions. The developed slippery surface can be applied to sustainable drag reduction of marine vehicles.

Biography:
Prof. Lee received his Ph.D. degree from the Department of Mechanical Engineering at the KAIST in 1986. He joined POSTECH (Pohang University of Science and Technology) as a faculty member on January of 1987. He is an international leader in bio-fluid flows, biomimicry and experimental fluid dynamics. He was elected as an APS (American Physics Society) fellow, for his contribution to experimental fluid mechanics, development of advanced flow
visualization techniques and their applications to bio-fluid flows, micro/nano-fluidics and nature-inspired technologies. Prof. Lee’s achievement was recognized by the National Medal of Science (2017) and he was elected to be the POSTECH University Professor on 2017. He has served as the president of several academic societies and the chairman of various conferences and workshops. He is working as director of BBRC (Center for Biofluid and Biomimic Research), sponsored by National Research Foundation, Korea.
An Explanation of Artificial Intelligence and Real-Life Applications: A Basic Mathematics Perspective

Dr. Sadeq Damrah
Australian University, Kuwait

Abstract
With the rise of artificial intelligence in modern times, many claim to be experts on the topic regardless of their deep technical knowledge. Others feel intimidated by the theory behind artificial intelligence and the algorithms related to it. This work provides an overview of artificial intelligence from a mathematics perspective. Furthermore, this overview will explain the nature of computer science as a mathematical science using the relevant jargon. Additionally, this work will provide basic arithmetic, number, algebra, trigonometry, calculus, linear algebra examples to show the mathematical background and the connection between mathematics, computer science, algorithms and engineering. Some business application will also be presented to show integration between engineering and business.

Biography:
Dr. Sadeq Damrah is currently an Assistant Professor of Mathematics at the Australian University - Kuwait. He taught various courses of mathematics including Calculus, Statistics and Differential Equations. His focus in teaching is to emphasize on applications of mathematics in engineering and other industries. In addition to expertise in mathematics teaching, his core research interests included applications of mathematics in engineering and finance. Dr. Sadeq is a former competitive swimmer, national champion and a swimming coach.
Applying SDRE to Design a Satellite Attitude Control System during Launch and Early Orbit Phase based on Cold Gas Thrusters

Luiz Carlos Gadelha de Souza*
Federal University of ABC, São Bernardo do Campo, SP Brazil

Abstract
The precision of controlling the attitude of a satellite during the injection phase in orbit is of fundamental importance for the success of the mission. In general, the satellite starts this phase with high angular velocity, and then the controller needs to manoeuvre the satellite to its nominal mode of operation, which is characterized by an attitude of small angles. One way to achieve such a transition between these two modes is using cold gas thrusters. In this paper, we investigate, by simulation, the Attitude Control System (ACS) algorithm during Launch and Early Orbit Phase which has nonlinear dynamics due to the high angular velocities and perturbations. As a result, the application of linear control techniques can compromise the performance and robustness requirements of the appointment.

To mitigate this problem, we apply the State-Dependent Riccati Equation (SDRE) technique which can deal with such a nonlinear system. The SDRE controller is based on cold gas thruster torques to perform the large-angle manoeuvre to reduce the high angular velocities. The investigation serves to validate the numerical simulator model and to verify the functionality of the control algorithm designed by the SDRE technique.

Keywords: Satellite Attitude Control System; Cold Gas Thrusters, SDRE.
**Biography:**
Dr. Luiz Gadelha has completed the degree in Physics from the University of Brasília (1978), the master's degree in Space Engineering and Technology from the National Institute for Space Research (1987) and the PhD in Space Engineering from the College of Aeronautics of Cranfield University (1992) England. He has experience in Aerospace Engineering, with emphasis on Satellites and other Aerospace Devices, working mainly on the following topics: dynamics and attitude control of flexible rigid satellites, parameter identification, optimal non-linear control and experimental investigation of control system performance. He was Senior Researcher at the National Institute for Space Research for many years, professor at the University of Brasília of the Aerospace Engineering course. He is currently professor teaching at the Federal University of ABC in the Aerospace Engineering Department in Sao Paulo, Brazil.
Optimization of Thermal Energy Storage by Thermocline Technology

Lingai LUO*
Université de Nantes, CNRS, Laboratoire de thermique et énergie de Nantes, LTeN, UMR 6607, F-44000 Nantes, France

Abstract
It has received an increasing attention because integrated TES systems can largely enhance the reliability and the dispatchability. Low-cost single storage tank based on the thermocline technology becomes an alternative to commonly-used two-tank system. However, the improper inlet/outlet manifolds may cause the strong mixing of hot and cold fluids and disturb the temperature stratification, resulting in reduced thermal performances of the storage tank.

An original CFD-based optimization algorithm is developed to determine the optimal flow distribution and restricted thermocline propagation manner using a SMT tank at high temperature as an example. A practical method for homogenizing residence times of the thermal front in order to flatten the thermocline zone is proposed, based on the insertion of a geometrically optimized perforated.

The feasibility of optimization algorithm is then validated experimentally by testing of a lab-scale cylinder SMT storage tank at low temperature, by measuring the local temperature evolutions of the fluid during both the charging and discharging operations. Results show that optimized Ring-opening plate distributors can significantly improve the energy and exergy efficiencies under large range of operating conditions.

After that, the mechanism of dynamic mixing and the jet entrainment phenomenon are particularly addressed by measuring the flow profiles inside a rectangular SMT tank using Particle Image Velocimetry (PIV) method. The local competing relation between the convection and diffusion heat transfer mechanisms on the degradation of temperature stratification is particularly explored.
Biography
Pr. Lingai LUO is Research Director of French National Center for Scientific Research (CNRS). She was Direction member of LTeN and the director of LOCIE, both Laboratories of CNRS. She was the cofounder and coordinator of Sino-French Collaboratory for Environmental and Process Engineering and the director of its successor Sino-French Laboratory for Sustainable Energy of French CNRS and Chinese Academy of Sciences. She is mainly engaged in the intensification of heat and mass transfer and the efficiency optimization in different energy components, systems and processes. She has developed an original strategy on the optimization of energy systems by a multi-scale approach associated with an innovative method of optimized management of fluid distribution. Shi is the author of 2 books and over 130 journal articles. She is serving as subject editor of Energy Journal, and associate editor of three others Journals.
Characterization of Bauxite by the Combination of Analytical Methods

Gordana Ostojic*
Alumina Ltd, Karakaj bb, Zvornik, Bosnia and Herzegovina

Abstract
Bauxite is the most important aluminium ore presently serving as a source of almost the entire world production of alumina and aluminium. Bauxites are a complex multi-component raw material with the basic components being the minerals of aluminium, iron, silicon, titanium, calcium and magnesium. The main minerals in bauxite include several forms of hydrated aluminum oxide: gibbsite (Al2O3•3H2O), boehmite (Al2O3•H2O) and diaspore (Al2O3•H2O). Bauxite also contains iron oxides like goethite (FeO(OH)), hematite (Fe2O3), the aluminum clay minerals kaolinite (Al2O3•2SiO2•2H2O), titan oxides like anatase and rutile (TiO2), titanium-iron oxide, mineralilmenite (FeTiO3), along with other minor trace level impurities. The quality of bauxite and the choice of process parameters are determined by the content of impurities in addition to the percentage content of Al2O3 and the mineral form in which it is found. In order to predict the Bayer process parameters of bauxite exploitation and more efficient production control of a Bayer plant it is necessary to know the chemical and mineralogical composition of bauxite, as a raw material. Based on these facts, for the assessment of bauxite quality in laboratory conditions, methods for fast, cheap, accurate, and precise characterization of bauxite are extremely important. Qualitative and quantitative mineralogical phase analysis of bauxite are mainly performed using XRD analysis. The quality of bauxite as seen from the aspect of its application in alumina production is determined on the basis of the content of Al2O3 and SiO2. Over the years various methods are used for the chemical characterization of bauxite. While classical methods were earlier used in chemical analysis, now instrumental techniques play a more important role, especially the multi-element analysis technique. Critical moments in implementation most of the mentioned methods are the sample preparation and the complexity of the matrix. Complete information on the quality of bauxite is obtained through a combination of several analytical methods. In this work, XRD, XRF-EDX, UV-VIS, AAS, and ICP-OES methods were used for chemical-mineralogical analysis of bauxite.

Keywords:
Bauxite; Method Analysis; Sample preparation.
Biography:
Gordana Ostojic is engineer of technology and master of chemical sciences in the field of general and applied chemistry. She has worked on several positions in the Quality control sector in "Alumina" company in Zvornik, Bosnia and Herzegovina, since 2000. During this period she has performed physico-chemical analysis of difference materials, like bauxite, red mud, aluminium hydroxide, aluminium oxide-alumina, zeolite, clay, aluminate solution. Her areas of interest include characterization of materials, multielement chemical analysis, analytical methods development and validation, evaluation measurement uncertainty in chemical analysis, data processing laboratory automation system.
Significant Feature Extraction From Whole-Slide Images For Diagnosis And Prognosis Of Triple-Negative Breast Cancer (TNBC)

Claudio Fernandez-Martín*
Institute of Research and Innovation in Bioengineering, Universitat Politècnica de València, Valencia, Spain

Abstract
Breast cancer diagnosis and prognosis rely on accurate analysis of histopathological images. This presentation encompasses the research conducted for the PhD thesis titled "Significant Feature Extraction From Whole-Slide Images For Diagnosis And Prognosis Of Triple-Negative Breast Cancer (TNBC)." It focuses on two key aspects: mitoses detection and molecular subtype classification in breast cancer.

Mitotic activity is a crucial biomarker for diagnosing and predicting outcomes in breast cancer. However, manual mitosis counting is challenging and time-consuming for pathologists, leading to moderate reproducibility. To address these limitations, we propose a weakly supervised approach for mitosis detection using histological haematoxylin and eosin (H&E) whole-slide images (WSIs). Our approach eliminates the need for complex labelling scenarios and employs an Uninformed Teacher-Student (UTS) pipeline to distil uncertain samples. We evaluate our approach on the TUPAC16 dataset and demonstrate robust generalization across different breast cancer datasets. Our method achieves an F1-score of 0.767 and outperforms state-of-the-art approaches, challenging the need for strong mitosis location information and multiple refinement stages. Additionally, we propose an automatic proliferation score that correlates moderately with the pathologist-annotated mitotic activity index (MAI), providing a potential objective evaluation tool for tumor proliferation.

Breast cancer exhibits distinct molecular subtypes, necessitating personalized treatment planning. Deep learning-based multiple-instance learning (MIL) methods have shown promise in subtype prediction, but the importance of considering contextual information has recently emerged. To address this, we propose a context-aware weakly supervised deep learning approach for molecular subtype prediction in breast cancer WSIs. Using a non-context-aware CNN backbone trained under the MIL paradigm as a baseline, we extract features from patches within each WSI. A graph representation of the WSI is constructed, leveraging spatial proximity to determine edges. By training a graph convolutional network (GCN) on this representation, we incorporate contextual information to enhance subtype prediction accuracy. Our approach
achieves state-of-the-art accuracy in classifying Luminals, HER2+, and TNBC subtypes, underscoring the significance of context in molecular subtype prediction.

In conclusion, this presentation provides a comprehensive overview of the research conducted for the PhD thesis. It showcases a weakly supervised approach for mitosis detection that eliminates the need for intricate labelling scenarios, resulting in robust generalization across breast cancer datasets. Furthermore, it presents a context-aware deep learning approach for molecular subtype prediction, which achieves state-of-the-art accuracy by incorporating contextual information. The findings contribute to improved diagnosis, prognosis, and personalized treatment planning for triple-negative breast cancer.

**Keywords:**
Mitosis detection, Molecular subtype prediction, Weak labels, Histology, Digital pathology.

**Biography:**
Claudio Fernandez Martín is a driven and talented young researcher in the field of Deep Learning and Computational Pathology. As an Early-Stage Researcher in the CLARIFY Project, a European Marie Skłodowska-Curie Actions scholarship initiative from the European Union, he is working towards his PhD with the focus on the development of Deep Learning models for the prediction, diagnosis, prognosis, and treatment of Triple-Negative Breast Cancer in Whole-Slide Images.

Claudio's academic journey began with his Bachelor's degree in Telecommunications Engineering at the Polytechnical University of Valencia (UPV), Spain. He furthered his education with a year of study at the Technical University of Munich, Germany, where he completed his Bachelor's Thesis in Saliency Prediction for 360° Virtual Reality Videos that received the honours degree at the UPV. Following that, he earned a Double Master's Degree in Human-Computer Interaction & Design + Entrepreneurship and Innovation from the EIT Digital (European Institute of Technology). During the first year of his master's, he studied at the University of Twente, Netherlands, and during the second year, he was at KTH Royal Institute of Technology, Sweden, where he conducted his Master's Thesis in Voice Cloning in collaboration with the CVBLab (Computer Vision and Behaviour Analysis Lab) from the UPV in Valencia, Spain.

His current research at the CVBLab focuses on extracting significant features from medical images for the accurate prediction of the prognosis and diagnosis of Triple-Negative Breast Cancer. In this regard, he has specialized in the subfields of Automatic Mitoses Detection, Molecular Subtypes Prediction, and Recurrence prediction. His most recent research, "Challenging mitosis detection algorithms: Global labels allow centroid localization," was presented at the IDEAL2022 Conference in Manchester, UK, where it was awarded as the Best Paper of the Conference.
In addition to his research, Claudio has also gained valuable experience as a visiting researcher at the Stavanger University Hospital and the Stavanger University in Norway and the Department of Computer Science and Artificial Intelligence of the University of Granada in Spain. His exceptional research skills and dedication have led him to be invited to speak at the ASETMEET2023 Conference in Vancouver, Canada, where he will share his latest research findings and insights with other professionals in the field of Deep Learning and Computational Pathology.
Psychological Safety in Aviation and Aerospace Sector and Human Factors

Celia Avila-Rauch*
EuroSpaceHub, LUNEX EuroMoonMars, International Moon base Alliance, NeuroTech Lab, Space Renaissance International

Abstract
Aerospace psychology assess teams facing extreme environments like spaceflight, such as acceleration, microgravity, radiation, etc., dealing daily with health problems, sudden temperature changes, corrosive dust, vibrations, small places to live, digitalization, stress and isolation, as well as living in constant uncertainty. Missions represent a challenge but, at the same time, a high health risk, especially in the psychological sphere. For this reason, prior preparation is required, simulating different scenarios. Isolation, confinement, radiation, reduced water consumption, analogous environments, lack of gravity, distance from Earth, etc., will increase the prevalence and severity of some affective, cognitive, physical and behavioral symptoms. We must understand that space tasks require a balance between people and machines.

Human factors are the research that studies how humans interact with the world around them, focusing on designing safe, efficient and effective systems, products and environments for human use. Human factors encompass a wide range of areas, including psychology, physiology, engineering and design. The goal of human factors is to optimise people's performance, health and well-being by taking into account their capabilities and limitations. The safety of flights and habitat stays depends on health, in a holistic sense, and particularly on the mental health of all operators, not just astronauts. Security is done by respecting the specificity of the conditions and stressors, promoting mental health, and thus seeking to optimize their tasks. When the adaptive psychological resources of the team members are overwhelmed, secondary maladaptation syndromes appear, for example, and their therapeutic approach constitutes an essential occupational problem. The importance of human adaptation to different environments has drawn the attention of psychologists to mental health. Furthermore, it has led to the discovery of new areas of scientific research focusing on the aerospace and aeronautical environment.

Human Behaviour is determined by genetic and environmental factors that affect the individual. Human behaviour is a broad field of study encompassing a wide range of actions, thoughts and emotions people display. Genetics, environment, culture and personal experiences determine human behaviour. Cognitive processes will be influenced by the complexity of the tasks required by this type of work.

Keywords: Human Factors, Human Behavior, Human Performance
Keywords:
Human Factors, Human Behavior, Human Performance

Biography:
Trained at the University of Girona (UdG), Spain. Master in Psychology at Autonomous University Barcelona (UAB), Spain. Clinical Psychologist and active cognitive behavioural psychotherapist in Munich, Germany and Spain. Master's Degree in Behavioural Medicine (UAB); Research Proficiency in Psychiatry and Medical Psychology (UAB). European Certificate of Psychotherapy (EUROPSY), World Certificate of Psychotherapy (WCP). Coach certificate. Certificate as Supervisor of medical psychotherapists and psychologists with a cognitive behavioural orientation by the official Bavarian School of Psychotherapy in Munich, Germany. Specialised in emotional intelligence skills by the EISkills Group of Yale University, MSCEIT ™ Mayer-Salovey-Caruso Certificate in Emotional Intelligence. Lecturer at the International University IU in Psychology in Munich, and lecturer at the Master of Aviation Psychology in Spain, at the Department of Aviation Psychology of the Colegio de Psicólogos de Madrid. Certified as an Aviation Psychologist and member of the Working Group of Madrid and Barcelona Chamber of Psychologists in Aviation Psychology. An aerospace psychologist at Space Psychology department coordinator Lunex – EuroMoonMars in the Netherlands. Trainer of Alba Emoting™ and Breath Xpress techniques. Researcher at the University of Cadiz in the Department of Neuropsychology - Human Factors - Neuroteklab. Member of Barcelona, Madrid and Munich psychologists' chambers. Since 2020, I have been researching psychological and interpersonal issues affecting people working in space. Space simulation mission. My book includes The Dark and light sides of Leadership and Collaboration at the book with Jara Pascual, chapter 4 of the book Innovation and Cooperation in the digital era, “The Secrets of Collaboration – using emotional intelligence for Innovation and Collaboration.” and several professional publications in clinical psychology and space psychology. For a month, I participated in a space simulation mission at HI-SEAS Hawaii as a pilot project for analogue tasks in space psychology, which is an ongoing project. My thirty years of experience and professional work in clinical psychology, psychotherapy and coaching with a cognitive-emotional approach and personality development in three different countries have shown me how important our emotions, actions and behaviours are for our existence. Currently, I work in my practice as a psychotherapist and run my own coaching company, "Windrose Global Advisors", an Active member of EuroSpaceHub in the Netherlands as a space psychologist. Member of EAAP (European Association of Aviation Psychology), member of SEAPAC (asociación Española Psicología Aeroespacial y Aeronáutica Civil) and Member of the SRI (Space Renaissance International).
Short Duration Premium and Term Structure of Equity Returns

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Abstract
This study aims to provide a comprehensive examination of the equity term structure and its implications across 20 global stock markets. Specifically, we aim to address several key questions: whether the equity yield curve is generally downward-sloping across all markets; whether the shape of the equity term structure varies by market and what factors drive such variations; the time-varying characteristics of the equity term structure; and whether the observed short-duration premium can be explained by major risk factors such as size, value, and liquidity. Additionally, we assess the suitability of the value factor and Altman Z-score as proxies for equity duration and evaluate the influence of monetary policy changes on the equity term structure.

This study builds upon the existing literature, which provides inconclusive results regarding the shape of the equity term structure and its determinants. Our research is designed to fill gaps in the literature, particularly concerning market-specific variations and the influence of risk factors and monetary policy on the equity term structure.

We calculate the annual returns as the log return to buying a stock and holding it for 12 months. We estimate implied equity duration using an augmented version of Dechow et al. (2004). We measure book-to-market (BTM) and firm size (MV) following Fama and French (1993). We measure illiquidity level (ILLQ) following Amihud (2002).

We find that the equity term structure is downward sloping in most of the markets in our sample, and the short-duration premium persists after controlled for size, value, and liquidity. However, the magnitude of short-duration premium varies by markets. The equity term structure shows time varying feature appears to be countercyclical.
Keywords:
Asset pricing, Equities, Risk premium, Implied equity duration.

Biography:
Shuxin Yang is a PhD candidate in Economics at Waseda University. Her research focuses on the term structure of equity and the stock market. Shuxin's work seeks to understand the dynamics of stock prices across different maturities and the factors that drive these dynamics. Prior to pursuing her PhD, Shuxin earned a Bachelor's degree in Accounting and Finance from the De Montfort University and a Master's degree in Finance from Bayes (previously, Cass) Business School. She also gained experience in the financial industry by working as a quantitative analyst for a major investment bank in Tokyo. Shuxin's research has been presented at several academic conferences. She is particularly interested in exploring the implications of the term structure of equity for asset pricing, portfolio allocation, and risk management. Through her research, Shuxin aims to contribute to the development of innovative investment strategies that can help investors better understand and manage risk in the stock market.
Abstract Resolvent Families on Time Scales

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Abstract
The theory of time scales was introduced for the first time by S. Hilger in 1988 and, in recent years, attracted the attention of many researches, due to its capacity of encompassing the theories of differential equations, difference equations, quantum calculus and quantum difference equations, among others. Besides, this theory includes scales that present both discrete and continuous behavior. By the other hand, these time scales play an important role in applications, allowing the modeling of many phenomena in several areas of knowledge. In this talk, we begin to introduce the concept of abstract resolvent family, from analyzing some examples in diverse contexts. After, we make a treatment by means of Laplace Transform to get a general formulation of dynamic equation on time scales, allowing to include the cases of first-, second- and fractional-order cases. Then, with this formulation, we give a relationship between the family and its infinitesimal generator, the main properties, and finally we give some explicit representations of such resolvent families, depending on the time scale itself.

Keywords:
Dynamic equation on time scales; abstract Cauchy problem; Resolvent family.

Biography:
Aldo Pereira is Assistant Professor at the Department of Mathematics, Universidad de La Serena, in Chile. He received a Ph. D. degree at Universidad de Talca (Chile), and had a postdoctoral position at Universidade de Brasilia (Brazil). His principal area of research is Functional Analysis, with emphasis in qualitative theory of differential equations, and dynamic equations on time scales.