GECAET 22

# CERTIFICATE
## OF APPRECIATION

**Speaker**

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For phenomenal and worthy presentation on "**Novel High-Throughput Methods for Multi-Scale Phenotyping in Agriculture**"
at the "**Global Experts Conference on Applied Science, Engineering and Technology (GECAET-2022)**"
held on July 28-29, 2022 in Amsterdam, Netherlands

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Global Experts Conference on

# Applied Science, Engineering and Technology

July 28-29, 2022

Virtual Conference

## (GECAET-2022)

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Title: Equilibrium Locus of the Flow on Circular Networks of Cells

# General Information

Virtual Conference the Global Experts Conference on Applied Science, Engineering and Technology (GECAET-2022) will be held on July 28-29, 2022.

The main objective of the meeting is to promote contacts between scientists working in Applied Science, Engineering and Technology, to share experiences, to spread the latest information on progress in their specialties and related fields, to gain visibility for their research, to put young researchers interacting with their peers and seniors, and to develop professionally. The program includes invited talks, oral and e-poster communications.

# Welcome Message

Dear Colleagues,

It gives me great pleasure to welcome you to GECAET-2022 – The Global Experts Conference on Applied Science, Engineering and Technology to be held on 28-29 of July 2022.

The conference aims to become the premier international meeting for presentations, discussions and exchange of state-of-the-art information on fundamental and applied knowledge in the diverse area of Applied Science, Engineering and Technology. The conference offers the participants an international forum for following key research challenges not only in their specific areas of interest but also an opportunity to be fully informed in the latest developments in other areas of Applied Science, Engineering and Technology.

We will be putting together a programme of plenary and keynote presentations by leading experts in their fields, followed by presentations on specific research topics, offering ample time for discussion and exchange of ideas. We aim to promote a true global interaction between academic and industrial colleagues, encourage exchange of ideas and facilitate international collaboration.

Thanking you,
GECAET-2022

# Organizing Committee

**Karl Heinz Gresslehner**
University of Applied Science, Austria

**Vladimir Chigrinov**
The Hong Kong University of science and technology

**Zeki Ayag**
Kadir Has University, Turkey

**Hao Ying**
Wayne State University, USA

**Francesco Tornabene**
University of Salento, Italy

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University of Crete, Greece

**Jakub kostecki**
University of zielona Góra, Poland

**Ramesh Agarwal**
Washington university in St.Louis, USA

**Chen Chin Chang**
Hunan Womens University, China

## Virtual Presentations July 28, 2022

## Netherlands Time Zone (GMT+2)

| | | |
|---|---|---|
| 10:00-10:30 | K | Title: Smart Multi-Generation Utilities Plant Tailored for Tropical Climates<br>**Chua Kian Jon Ernest,** National University of Singapore, Singapore |
| 10:30-10:55 | I | Title: Integration of 2D Materials on Silicon Photonics Towards a Novel Platform of Information Processing<br>**Sanghoon Chae,** Nanyang Technological University, Singapore |
| 10:55-11:20 | I | Title: Distributed Processing of All-Nearest Neighbour Queries in Road Networks<br>**Muhammad Attique,** Sejong University, Korea |
| 11:20-11:45 | I | Title: Towards Privacy-Preserving Indoor Location-Based Services for Smart Cities<br>**Vahideh Moghtadaiee,** Shahid Beheshti University, Iran |
| 11:45-12:10 | I | Title: Are Meso-Surfactant and Nano-Surfactant Effective as a Filter Cake Breaker in the Synthetic Based Mud Drill-In Fluid?<br>**Sonny Irawan,** Nazarbayev University, Kazakhstan |
| 12:10-12:35 | I | Title: Importance of the Usage of GIS and its Affect on Decision Making for Urban Planners<br>**Omar Aboulola,** University of Jeddah, Saudi Arabia |

**Eye Relaxation Break 12:35-13:05**

| | | |
|---|---|---|
| 13:05-13:30 | I | Title: Equilibrium Locus of the Flow on Circular Networks of Cells<br>**Yirmeyahu Kaminski,** Holon Institute of Technology, Israel |
| 13:30-13:55 | I | Title: Robotification of Online Price Setting - Artificial Collusions and a New Societal Economic Risk<br>**Kenneth Carling,** Dalarna University, Sweden |
| 13:55-14:20 | I | Title: Data Collection Methods for Competitive Pricing Strategies<br>**Charlie Lindgren,** Dalarna University, Sweden |
| 14:20-14:45 | I | Title: Advanced Digital Signal Processing Methods Based on Virtual Instrumentation Designed for Cybernetics and Biomedical Engineering<br>**Radek Martinek,** Technical University of Ostrava, Czech Republic |
| 14:45-15:10 | I | Title: Biochemistry Provides the Inspiration for a New Kind of AI<br>**Gerry Wolff,** Cognition Research, UK |

**Eye Relaxation Break 15:10-15:40**

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|---|---|---|
| 15:40-16:05 | I | Title: K-means Clustering Approach to GNSS Jamming Detection via Graphical Representations of Radio Frequency Signals<br>**Swinney Carolyn,** University of Essex, UK |

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|---|---|---|
| 16:05-16:45 | P | Title: **Magneto-Plasmonic Nanoparticles for Brain Therapeutics**<br>**Ya Wang,** Texas A&M University, USA |
| 16:45-17:15 | K | Title: **The Economics of Environmental Disasters: Aid, Insurance and Financial Leverage**<br>**David Nickerson,** Ryerson University, Canada |

**End of Day 1**

## Virtual Presentations July 29, 2022

## Netherlands Time Zone (GMT+2)

| | | |
|---|---|---|
| 10:00-10:25 | I | Title: **Forecasting the Output Power of Photovoltaic Panels using Artificial Intelligence Approaches**<br>**Chahboun Souhaila,** Mohammed V University of Rabat, Morocco |
| 10:25-10:50 | I | Title: **New Solutions for Storing and Using Surplus Electricity in Methanol**<br>**Edgar Harzfeld,** Stralsund University, Germany |
| 10:50-11:15 | I | Title: **Machine Learning Approaches to Neuroscience: Challenges and Opportunities in EEG**<br>**Giulia Cisotto,** University of Padova, Italy |
| 11:15-11:40 | I | Title: **The Energy Efficiency of Building Components. The Case of Historical Masonry Through a Multidisciplinary Approach**<br>**Marianna Rotilio,** University of L'Aquila, Italy |
| 11:40-12:05 | I | Title: **Core-Set**<br>**Dan Feldman,** University of Haifa, Israel |
| 12:05-12:30 | I | Title: **Synergy Between TMZ and Individualized Multimodal Immunotherapy to Improve Overall Survival of IDH1 Wild-Type MGMT Promoter-Unmethylated GBM Patients**<br>**Stefaan Van Gool,** Catholic University of Leuven, Belgium |

**Eye Relaxation Break 12:30-13:00**

| | | |
|---|---|---|
| 13:00-13:25 | I | Title: **Machine Learning for Emergency Service Applications**<br>**Reilly Denis,** Liverpool John Moores University, UK |
| 13:25-13:45 | E poster | Title: **Enabling Wireless Communications in on-Chip and in-Package Networks**<br>**Josep Sole Pareta,** Universitat Politècnica de Catalunya, Spain |
| 13:45-14:10 | I | Title: **Novel High-Throughput Methods for Multi-Scale Phenotyping in Agriculture**<br>**Colorado Julian,** Pontifical Xavierian University, Colombia |

| | | |
|---|---|---|
| **14:10-14:35** | I | Title: **Exploring the Structural Quality of Python Open Source Systems**<br>**Safwan Omari,** Lewis University, USA |
| **14:35-15:00** | I | Title: **Making Life Accessible Through Machine Learning Applications**<br>**Emily M Hand,** University of Nevada, USA |
| **15:00-15:40** | P | Title: **Effects of Pressure Side Film Cooling Hole Placement and Condition on Surface Heat Transfer Characteristics of a Transonic Turbine Blade Tip**<br>**Phillip M. Ligrani,** University of Alabama in Huntsville, USA |

**End of the Virtual Program**


Day
1

# *Plenary*

**Ya Wang**
Associate Professor, Mechanical Engineering, Leland T. Jordan Career Development Professor Faculty, Biomedical Engineering & Electrical and Computer Engineering.

**Abstract:**

This talk introduces magneto-plasmonic nanoparticles (NPs) as a novel facile assembled nanoplatform to deliver drugs on-demand and to regulate neuron activities. Two types of NPs will be introduced: solid gold coated superparamagnetic iron oxide (SPIO) coated with solid gold (Au-SPIO) and SPIO coated with hollow gold (SPIO-HG). Both types can be stimulated by remote magnetic fields and/or light near their surface plasmonic resonance (525 nm for Au-SPIO and 808 nm for HG-SPIO). In particular, once conjugated with porous coordination cages through the thiol containing molecules (SH-PEG-Py(RhB)) as a bridge, their surface charges can be easily tuned by adjusting the amount and type of functional groups as well as the experimental conditions, and thus facilitate tailored drug loading and release. We have demonstrated effective drug loading and controlled release of a typical type of therapeutic molecules, retinoic acid (RA), by trapping the RA into the cage via electrostatic interactions. Importantly, magnetic stimulation promotes voltage-gated Ca2+ channel (VGCC)-mediated spontaneous Ca2+ fluxes in primary cultured mouse midbrain neurons and in vivo blood brain barrier crossing, compared to standalone Au-SPIO NPs. This talk will also introduce how to intelligently drive these NPs to the targeted brain tissue site precisely, which involves not only experimental observations but also analytical and numerical analysis of their dynamic transport behavior inside the central nervous system vasculature.

**Biography:**

Dr. Wang is currently an Associate Professor in the Department of Mechanical Engineering (MEEN), Texas A&M University. Before then, she was an Assistant Professor in the Department of Mechanical Engineering at Stony Brook University (2013-2018) after her Postdoc research fellowship in the Aerospace Engineering at University of Michigan (2012-2013) and her Ph.D. study in the Department of Mechanical Engineering at Virginia Tech (2007-2012). Dr. Wang's research interest is focused on nanorobotics, sensors, controls, and machine learning with applications to human sensing, activity tracking, Internet of Things, energy harvesting, nanomedicine, and biomedical devices. The overall goal of her research is to be vibrant and adaptable to the high impact innovations in the areas of mechanical, materials science, electrical engineering, and biomedical engineering. Dr. Wang was awarded the 2018 NSF Career Award, 2015 Special Congressional Recognition, and 2015 DOE Wave Energy Prize. She was also the advisor to Six Semi-finalists of Intel/Regeneron Science Talent Search. She has authored 1 book chapter, 45 journal papers and 38 conference proceeding papers and filed 4 U.S. utility patents, and 2 provisional patents. She is the associate editor of the Journal of Intelligent Material Systems and Structures (2019 - date). She is a member of ASME, SPIE, AIAA and IEEE, the conference symposium chair of 2018 ASME SAMSIS, and the technical committee member of ASME SMASIS, and SPIE NDE/smart structures.

# *Keynote*

## *Smart Multi-Generation Utilities Plant Tailored for Tropical Climates*

**Chua Kian Jon Ernest**
Department of Mechanical Engineering, National University of Singapore.

**Abstract:**

This presentation focuses on the development of a unique smart quad-generation plant, whereby all four key resources are generated simultaneously using a single, integrated system in an energy efficient manner, through maximizing the recovery of its generated waste energy. Specifically tailored for tropical countries, the plant can contribute to greater energy and cost savings, and is also more space-efficient. More importantly, it can significantly reduce energy consumption by 30 per cent or more and potentially trim the amount of carbon dioxide emitted to the environment by 2 to 4 per cent for countries at business-as-usual levels while meeting varying needs of electricity, potable water, cooling and heating the smart plant uses natural gas as the main energy source to power micro turbines to produce electricity. Waste heat from exhaust gas generated in the process is efficiently recovered and channeled back to power chillers to produce chilled water, which is required to cool and dry air for air-conditioning. The plant is also able to recycle waste water of any kind to produce portable water. Hot water or steam can also be produced by tapping into the waste heat generated from the plant. One key breakthrough involves the cascading waste heat utilization method that maximizes the potential of recovered waste-heat from turbines to generate multiple invaluable utilities in the smartest manner.

**Biography:**

Dr. Chua Kian Jon is currently an Associate Professor with the Department of Mechanical Engineering, National University of Singapore. He has been conducting research on air-conditioning, refrigeration, and heat recovery systems since 1997. He has conducted both modeling and experimental works for specific thermal energy systems. These include dehumidification, cooling, heat pumping, compact heat exchangers, and refined temperature/humidity control. He is highly skilled in designing; fabricating; commissioning and testing many sustainable energy systems to provide for heating, cooling, and humidity control for both small- and large-scale applications. He has more than 200 international peer-reviewed journal publications, 6 book chapters, and two recent monographs on advances in air conditioning (https://www.springer.com/gp/book/9789811584763 and https://www.springer.com/gp/book/9783030808426). He was highlighted among the top 1% of scientists in the world by the Universal Scientific Education and Research Network and the top 0.5% in the Stanford list of energy researchers. His works have garnered more than 10,600 citations with a current h-index of 55. Further, he owns more than 10 patents related to several innovative cooling and dehumidification systems. He is the Principal Investigator of several multi-million competitive research grants. Additionally, he has been awarded multiple local, regional, and international awards for his breakthrough research endeavors.

## *Charity Hazard and Natural Disasters: Financial Leverage, Market Insurance and the Optimal Allocation of Public Aid*

**David Nickerson**
Professor, Rogers School of Management, Ryerson University.

**Abstract:**

Observations of underinsurance by property owners and significant differences in coverage across similar communities exposed to disaster risk have often been interpreted as evidence of the prevalence of moral hazard or suboptimal decision-making by residents of these communities. We explain these observations as the outcome of a coordination game between such property owners in the presence of mortgage financing and public aid. We characterize the class of optimal allocations of public aid to both affected communities and their residents and show, in the context of such aid programs that the equity interests of property owners preclude more than the minimal insurance coverage mandated by mortgage lenders and that the presence of financial leverage and public aid will generate distinct Nash equilibria in which residents will either efficiently insure their property ex ante or eschew private insurance in favor of exercising their option to default on their loans and/or receiving ex post public transfers. We subsequently also show that an incumbent government will strategically allocate aid across communities distinguished only by their prospective support for the reelection of that government, which results in the divergence of community patterns of aggregate insurance coverage. On the basis of these results, we conclude that any program in which either loss-based public aid to property owners or the mitigation of insolvency risk through public transfers to lenders will invariably cause strategic complementarity between the insurance decisions of individual property owners and, consequently, create economic inefficiency even in the presence of otherwise efficient risk markets.

**Biography:**

Dr. David Nickerson is a Professor of Distinction in the Department of Real Estate Management, Ted Rogers School of Management, at Toronto Metropolitan University (formerly Ryerson). His research focuses primarily on public policy and community recovery from natural disasters, as well as various topics in financial intermediation, lending discrimination, secondary mortgage markets, risk and insurance, real options, and property valuation. Dr. Nickerson was, most recently, Senior Financial Economist in the Research Office of the Consumer Financial Protection Bureau, a division of the Board of Governors of the Federal Reserve System in the United States. Prior to his appointment with the CFPB, Nickerson was also the inaugural Bennett Chair in the Heller College of Business at Roosevelt University, Deputy Chief Economist at Freddie Mac, a professor of economics and finance at Duke University, Colorado State University, American University and the University of British Columbia, and an advisor to the governments of Vietnam and the People's Republic of China.

# *Speakers*

## *Novel Information Processing Using a Novel Platform of 2D Materials Integrated Silicon Photonics*

**Sanghoon Chae**
School of Electrical and Electronic Engineering (EEE), School of Materials Science and Engineering (MSE), Nanyang Technological University (NTU), Singapore.

**Abstract:**

By using optical platforms instead of metallic interconnects, photonic devices can achieve both high speed and low power consumption suitable for next generation information processing [1]. Although the state-of-the-art silicon (Si) photonic chips are outstanding optical platforms for light propagation, it requires external active optical components such as light sources and photodetectors. A potential solution comes in the form of atomically thin two-dimensional (2D) materials. Their remarkable optoelectronic properties are widely tunable by doping, strain, and external fields, owing to their atomic thickness and unique characteristics [2]. Moreover, their two-dimensional planar structure is suitable for integration into a planar photonic platform. In this presentation, I will discuss my current endeavors of novel photonics and optoelectronics functions using 2D materials integrated Si photonic, including ultra-low loss phase modulations [3]. 2D-Si photonic applications for quantum information processing that can outperform conventional computers are demonstrated.

**Biography:**

Dr. Chae received his B.S. (2010) and Ph.D. both in Sungkyunkwan University (SKKU). Then he worked in Columbia University from 2016 to 2021 as a Postdoctoral Research Scientist. In September 2021, he appointed as a joint Nanyang Assistant Professor at the School of Electrical and Electronic Engineering (EEE) and the School of Materials Science and Engineering (MSE) at Nanyang Technological University (NTU).
Dr. Chae's research primarily focus on understanding novel optoelectronic phenomena in atomically thin 2D materials systems, exploring their application as a new class of optoelectronic devices, and integrating their optical functions into Si photonics for information processing.

**Muhammad Attique**
Assistant Professor, Department of Software, Sejong University,
Seoul, South Korea.

**Abstract:**

Nowadays, mobile and sensing devices have already become widely adopted in day-to-day lives. The global positioning system (GPS) service has made remote sensing and location tracking more viable. Due to this, a tremendous amount of query requests are being generated that can no longer be processed by a central machine efficiently. Among the query requests, one such query is All Nearest Neighbor (ANN) queries, which extracts and returns all the closed data objects for all query objects. It is the combination of k-nearest neighbors (kNN) and join queries. It is useful for applications in different domains such as transportation optimization, ride-sharing, and etc. As these applications are responsible for generating a massive amount of query requests, it demands huge computation to return these query requests, and a single machine cannot meet the demand. In this paper, we propose a distributed query processing framework to process ANN queries using the Apache Spark framework, aiming to achieve superior query efficiency and scalability against other methods and design alternatives.

**Biography:**

Muhammad Attique is currently working as an Assistant Professor in the department of Software, Sejong University, South Korea. He received the bachelor's degree in information and communication systems engineering from the National University of Science and Technology, Pakistan, in 2008, and the Ph.D. degree in Computer Science and Engineering from Ajou University, South Korea, in 2017. His research interests include spatial queries, big data analysis, social network analysis, information retrieval, and health care monitoring systems.. He has published over 40 research articles in SCI(E) journals.

**Vahideh Moghtadaiee**
Shahid Beheshti University, Tehran, Iran.

**Abstract:**

Indoor positioning has become increasingly popular as the Internet of Things (IoT), smart buildings, and smart cities have been developing rapidly in the past decade. The majority of people also spend most of their time in indoor areas, and use a variety of mobile devices such as smartphones, tablets, and smart watches, all of which generate various location data frequently that are then sent to the Location Service Providers (LSPs) to get location-dependent online services. Several Location-Based Services (LBS) can be employed in different indoor environments, e.g., hospitals, shopping malls, factories, museums, airports, libraries, etc., and provide multiple applications including health services, disaster management, security, marketing and customer assistance, robotics, and asset management and tracking. However, location information includes highly sensitive information that may threaten users' privacy and security, so they are generally reluctant to reveal it. Additionally, sharing this data violates users' privacy rights in several countries, for example, the EU's General Data Protection Regulation (GDPR), because the continuous recording and monitoring locations and timings of users' activities can reveal their interests, workplaces, social habits, customs, travel patterns, and even health states. Accordingly, location privacy is the primary barrier to widespread adoption of localization services, which is defined as the ability to prevent attackers, intruders, and malicious third parties from finding out where you are or where you have been. Therefore, many studies have been done to preserve users' location privacy against various attacks in an indoor environment, but it is still a challenging issue.

**Biography:**

Vahideh Moghtadaiee received her B.Sc. and M.Sc. degrees in Electrical engineering in 2004 and 2007, respectively. She got her Ph.D. in Electrical Engineering and Telecommunications from University of New South Wales (UNSW), Sydney, Australia in 2013. She was then awarded a postdoctoral writing fellowship at UNSW to follow up her research. In 2016, she continued as a Postdoc for more than two years. She is currently an Assistant Professor at the Cyberspace Research Institute at Shahid Beheshti University, Tehran, Iran. Her research interests include wireless communication, indoor localization and tracking, privacy preserving, machine learning approaches and data analysis.

# *Are Meso-Surfactant and Nano-Surfactant Effective as a Filter Cake Breaker in the Synthetic Based Mud Drill-In Fluid?*

**Sonny Irawan**
Department of Petroleum Engineering, School of Mining and Geosciences, Nazarbayev University, Nur-Sultan,010000, Kazakhstan.

**Dennis Wayo**
Department of Petroleum Engineering, School of Mining and Geosciences, Nazarbayev University, Nur-Sultan,010000, Kazakhstan.

**M. Taufiq Fathaddin**
Petroleum Engineering Department, Trisakti University, Indonesia.

**Totok R Biyanto**
Department of Engineering Physics, Institut Teknologi Sepuluh Nopember – Surabaya 6111, Indonesia.

**Abstract:**

Formation damage has a significant impact on the overall performance of the well productivity. Removal of filter cake which is deemed to be the main strategy of formation damage remediation is crucial in open hole completion with pre-slotted liner or stand-alone screen (SAS) as a mean of sand control. Without proper planning, inefficient filter cake removal can lead to tremendous consequences since filter cake can plug the sand control component. Making the condition worse, sand control component is susceptible to plugging. This highlights the importance of selecting an effective filter cake breaker that can successfully remove the filter cake through dissolution of the main solids that constitute the major portions of the filter cake which could be the weighting material, barite, or calcium carbonate. Besides that, a proper understanding of the mechanism of the filter cake breaker chemical would be very beneficial to comprehend the filter cake breaker efficiency. The laboratory study attempted to emulate the reservoir condition. Regained permeability testing using High Pressure High Temperature (HPHT) Filter Press aimed to test the ability of several commercial filter cake breakers in removing synthetic-based-mud drill-in-fluids (SBMDIF). Chelating-based filter cake breaker, meso-surfactant-based filter cake breaker and nano-surfactant-based filter cake breaker were the samples to be tested in the laboratory work. The condition of the filter cake after being soaked statically was visually interpreted and the regain permeability was recorded. The mechanism of each filter cake breaker to remove the SBMDIF filter cake was also examined. Based on the experimental study, meso-surfactant-based filter cake breaker was found to be more effective to remove SBMDIF filter cake compared to chelating-based filter cake breaker and nano-surfactant-based filter cake breaker.

Keywords: Filter cake, regained permeability, chelating based agents, meso-surfactant based filter cake breaker, nano-surfactant based filter cake breaker.

**Biography:**

Dr. Sonny Irawan has joined Petroleum Engineering at Nazarbayev University in Nur-Sultan, Astana in October 2019 as an Associate Professor. Prior to joining Nazarbayev University, Dr. Sonny was for twelve years at Universiti Teknologi PETRONAS at Malaysia, as MSc Drilling
Engineering Program Manager (2 years), Deputy Head of Petroleum Engineering (2 years) and Associate Professor of Petroleum Engineering. Prior to this, Associate Professor Sonny has worked for over 4 years with Chevron Pacific Indonesia (CPI) companies in Central Sumatera - Indonesia, working on drilling, workover and well completion issues, surface logging, well stimulation and cementing operations. His main research interests are on utilization of nano particles in drilling engineering, drilling optimization, cuttings transport, drilling fluid development, drilling fluid rheology, formation damage, and self-healing smart cement formulation. His activities extend to characterize nano tube, nano graphene and nano silica and understanding rock petrophysical properties and interaction of rock surfaces with formation fluids and mud filtrates and to fluid mechanics and multiphase flows. Dr. Sonny is implementing an artificial intelligent (AI), which is a predictive tool to optimize the drilling process regarding Weight on Bit, Torque and Rotational Speed and bit condition using field data. Dr Sonny has 5 patents (registered in Malaysia) in drilling fluid formulation and 1 patent in foam flooding detection and also has 55+ journal and 70+ refereed conference papers, more than 500 citations and i10-index of 15. He is leading author of 2 books chapter – Solid Control System to Enhance Drilling Performance and Bio-Based Oil Drilling Fluid Improvement Through Carbon-Based Nanoparticles Additives. He also published on 2020 one book with title - Flat Rheology Water Based Mud for Deepwater Drilling Operation under LAP LAMBERT Academic Publishing – German.

## *Importance of the Usage of GIS and its Affect on Decision Making for Urban Planners*

**Omar I. Aboulola**
Department of Information System and Technology, University of Jeddah, Jeddah, Saudi Arabia.

**Abstract:**

GIS benefits organizations of all sizes and in almost every industry. There is a growing interest in and awareness of the economic and strategic value of GIS. Land use and census data are of a significant value to urban planners, decision- makers, and investors. Moreover, Retail site selection is an important decision when locating and siting are tail business (Kuo, Chi, & Kao, 2002b). likewise, scholars have played an important role in studying car accidents solutions to prevent and reduce them. Therefore, Important decisions are made based upon historical data, i.e., inductive reasoning All above can be shown in multiple papers that have been published by Dr. Aboulola and moreover problematic environmental issues are being studied and under review to be published that will be discussed. These papers have showed the importance of data on maps and how GIS have been a tool to solve problems.

**Biography:**

Omar. I. Aboulola is an Assistant Professor at the Information Systems and Technology Department, Colle of Computer Science and Engineering (CCSE), University of Jeddah. He obtained his bachelor's degree of science in Computer Science from KAU back in 2001. In 2009, He earned his master's degree in information science from University of Indiana, Bloomington, USA. His master thesis was related to the technology of banking. Dr. Aboulola received his Ph.D. in Information Systems and Technology, from Claremont Graduate University (CGU), USA, 2018. His PhD dissertation aimed to design an innovative assistive technology to Help retail companies to predict optimum locations for their businesses. Dr. Aboulola has some publications in disciplinary fields of GIS, Persuasive Technology, and Design Science Research.

**Yirmeyahu J. Kaminski**
Depart. of Mathematics, Holon Institute of Technology, Holon, Israel.

**Abstract:**

We perform a geometric study of the equilibrium locus of the flow that models the diffusion process over a circular network of cells. We prove that when considering the set of all possible values of the parameters, the equilibrium locus is a smooth manifold with corners, while for a given value of the parameters, it is an embedded smooth and connected curve. For different values of the parameters, the curves are all isomorphic. Moreover, we show how to build a homotopy between different curves obtained for different values of the parameter set. This procedure allows the efficient computation of the equilibrium point for each value of some first integral of the system. This point would have been otherwise difficult to be computed for higher dimensions. We illustrate this construction by some numerical experiments. Eventually, we show that when considering the parameters as inputs, one can easily bring the system asymptotically to any equilibrium point in the reachable set, which we also easily characterize.

**Biography:**

Dr. Yirmeyahu Kaminski is an assistant professor at Holon Institute of Technology in the department of mathematics. He graduated from Ecole Nationale des Mines de Paris and got a Ph.D. from The Hebrew University of Jerusalem. His research focuses on geometry, either algebraic or differential, and its applications to computer vision, control theory and others.

## *Robotification of Online Price Setting - Artificial Collusions and a New Societal Economic Risk?*

**Kenneth Carling**
Dept of Data and Information Management, Dalarna University, Sweden.

**Charlie Lindgren**
Dept of Data and Information Management, Dalarna University, Sweden.

**Niklas Rudholm**
HFI -Institute of Retail Economics, Sweden.

**Abstract:**

Traditionally, consumer products have been traded at local, physical markets. More and more trade is transitioning to digital market places. A key part of trading is to set the price of the product. The price is a function of the marginal cost of production, the buyer's willingness-to-pay, the price of competing vendors and price of near-substitute products. A digital, omnipresent market place has the potential of making the latter two transparent and readily available for the buyer, which has led to the prediction of heightened price competition, price setting near to marginal cost and no profit for e-tailers. However, this prediction has not been confirmed, in spite of the increased price transparency caused by, inter alia, price comparison websites. Still, the price transparency might increase the e-tailers coordination of price setting. If so, economic shocks would constitute a greater societal risk than historically and collusions may be more common and more difficult to detect. There is also scope for the e-tailers to rely on robotified price setting to manage a broader product portfolio and adaptive price setting strategies. Here we will examine the price setting of a large set of e-tailers on seven national markets in six different currencies. Detailed pricing has been retrieved for 1.5 years with an hourly collection frequency. We shed light on the occurrence of robotified price setting and coordination.

**Biography:**

Kenneth Carling earned his PhD in statistics in 1995 at Uppsala University, Sweden. Currently working as professor in Microdata Analysis at Dalarna University in the Department of Data and Information Sciences, he has published some 50 peer-reviewed international articles on economics, transports including environmental impact assessments, operational analysis and computing in addition to statistical methodology and applications. He is also program manager for master program in Business Intelligence as well as Data Science. Currently he leads a Living Lab on data-sharing on the last-mile distribution market in a EU consortium, a project on a decision support system for retailers' site locations, and a study on applied technologies applied for online price setting.

**Charlie Lindgren**
Dept of Data and Information Management, Dalarna University, Sweden

**Abstract:**

As part of an ongoing research project in which competitive pricing strategies are to be studied, the need for data collection of a large and complex dataset for analysis were needed. Following previous literature on price dispersion and price setting online, an effort of constructing a large dataset were initiated, with data collection spanning 7 countries over 1.5 years. The data collection will be told through a narrative of how the researchers encountered challenges such as language differences, scope, frequency, website updates, ethical concerns, etc. which were then addressed to be able to collect as large a quantity of data as possible to enable further exploration and analysis of the data. In addition, the researchers need for adaptation to various developing circumstances as well as descriptions of methods used, and not used, are addressed. These, and other various aspects of data collection issues and solutions, are covered in this presentation. The dataset is described in detail, with connection to the literature on the area of competitive pricing as well as other avenues of research. Comparisons to other studies which has conducted similar attempts at data collection are then made, and strengths and weaknesses are brought to attention. Finally, based on the strengths and weaknesses with respect to the approach used, proposed suggestions for improvements are made.

**Biography:**

Charlie Lindgren is a Ph.D. in Microdata Analysis with a background and interest in primarily economics. He is currently working as a lecturer in Information and Communications Technology at the Department of Data and Information Science at Dalarna University, Sweden. Currently he is involved in a research project which studies whether price comparison websites make commerce more sensitive to the business cycle. He has also studied how voluntary online information sharing relates to retail pricing and firm performance by using machine learning and natural language processing, with results that support decision-making for stakeholders such as the Swedish Competition Authority.

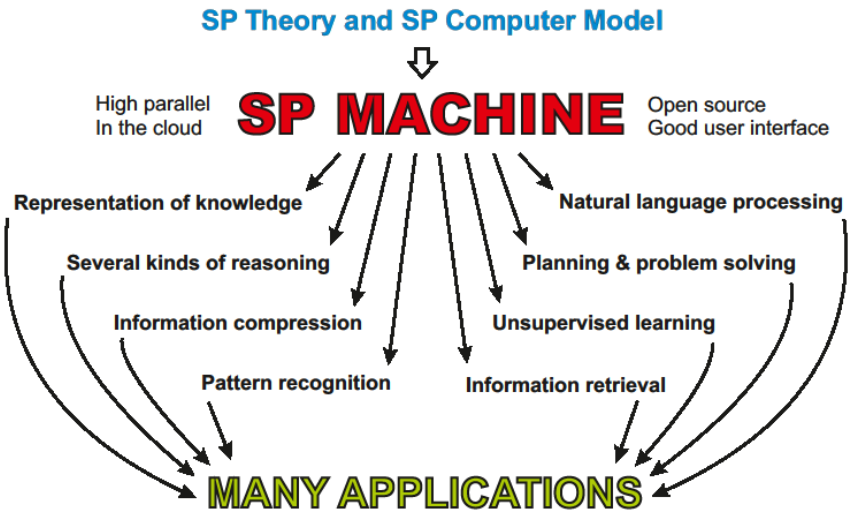
**Gerry Wolff**
Assistant Professor, Computer Science and Engineering 1664 N. Virginia Street, Reno.

**Abstract:**

The SP System (SPS), meaning the SP Theory of Intelligence and its realization in the SP Computer Model, is a unique attempt to simplify and integrate concepts across artificial intelligence, mainstream computing, mathematics, and human learning, perception, and cognition.
In the light of strong evidence for the importance of information compression (IC) in the workings of brains and nervous systems, IC is central in the design of the SPS.
The SP System has strengths and potential in four main areas:

- The clear potential of the SPS to solve 19 problems in AI research.
- The discovery and development of the powerful concept of SP-multiple-alignment, inspired by the bioinformatics concept of 'multiple sequence alignment'.
- Strengths and potential in aspects of intelligence:
  - Several kinds of intelligent behaviour.
  - Several kinds of reasoning.
  - Versatility in the representation and processing of AI-related knowledge.
  - The seamless integration of diverse aspects of intelligence, and diverse kinds of knowledge, in any combination.
- Other potential benefits and applications of the SPS in several areas of application.

The talk will also outline the proposal to build a high-parallel SP machine (figure below) as an open-source facility for further research by interested individuals and groups.
Further information, including details of publications with download links, may be found on www.cognitionresearch.org/sp.htm.



**Biography:**

Dr Gerry Wolff is Director of CognitionResearch.org. He has held academic posts in the University of Wales, Bangor, the University of Dundee, the University Hospital of Wales, Cardiff, and a one-year Research Fellowship with IBM in Winchester, UK. He has also worked as a Software Engineer with Praxis Systems plc in Bath, UK. His first degree at Cambridge University was in Natural Sciences and his PhD at the University of Wales, Cardiff, was in the area of Cognitive Science. For several years he worked on the development of computer models of language learning. Many insights from this research have been carried forward into his current research, developing the SP Theory of Intelligence and its realization in the SP Computer Model. Between early 2006 and late 2012, he was engaged full time on environmental campaigning (climate change) but is now concentrating on the development of the SP System, and raising awareness of the SP research.

## *K-Means Clustering Approach to GNSS Jamming Detection via Graphical Representations of Radio Frequency Signals*

**Carolyn J. Swinney**
DAir and Space Warfare Centre, Royal Air Force, UK; Computer Science and Electronic Engineering Dept., University of Essex, Colchester, UK. Liverpool John Moores University (School of Computer Science and Mathematics), UK.
John C. Woods, Computer Science and Electronic Engineering Dept., University of Essex, Colchester, UK.

**Abstract:**

Global Navigation Satellite Systems (GNSS) provide vital position and timing information to receivers on the ground. This service is relied upon worldwide for many industries including telecommunications, online banking and developing technologies such as driverless cars. GNSS signals are vulnerable to interference and low-cost devices called jammers purchased easily online create an interference signal so that the genuine signal cannot reach the receiver. Incidents of this nature are increasing in frequency with a recent report showing European interference incidents to have increased 20 times in the two-year period from 2018 to 2020. Timely identification of unwanted signals is paramount in dealing with this global issue. This paper shows that clustering graphical representations of the signal and utilizing convolutional neural network (CNN) feature extraction with transfer learning compared to raw radio frequency (RF) data produces a higher V-measure score and if used in conjunction with PCA dimensionality reduction can compete in terms of clustering time with raw data. Overall, this paper shows that CNN feature extraction of graphical representations of RF data and clustering is a viable way of identifying new GNSS jamming signals.

**Biography:**

Carolyn J. Swinney received a B.Eng.(hons.) degree (first class) in 2007 and a M.Sc.(dist.) in Electronics Engineering from the University of Essex, Colchester, UK in 2013. She graduated as a Communications and Electronics Engineering Officer in the Royal Air Force in 2014. She currently works within the Air and Space Warfare Centre and is working towards a Ph.D. degree in Electronic Systems Engineering at the University of Essex, Colchester, UK. Her main research interests are signal processing, unmanned aerial vehicles, neural networks, machine learning and cyber security.

John C. Woods was born in a small fishing village near Colchester, U.K., in 1964. He received the B.Eng. (hons.) degree (first class) in 1996 and the Ph.D. degree in 1999 from the University of Essex, Colchester, UK. He has been a Lecturer in the Department of Computer Science and Electronic Systems Engineering, University of Essex, since 1999. Although his field of expertise is image processing, he has a wide range of interests including telecommunications, autonomous vehicles and robotics.


Day
2

# *Plenary*


The role of networks to professionalise administrative staff

# *Effects of Pressure Side Film Cooling Hole Placement and Condition on Surface Heat Transfer Characteristics of a Transonic Turbine Blade Tip*

**Phil Ligrani**
Department of Mechanical and Aerospace Engineering, University of Alabama in Huntsville, Huntsville, Alabama, 35899, USA

**Abstract:**

Experimental data are provided for the surface of a blade tip within a transonic flow environment, which contains a squealer rim and a squealer recess. Four different film cooling arrangements are considered, each with holes placed at different locations along the upper pressure side of the turbine blade. The blade is mounted within a two-dimensional linear cascade, with four flow passages and five complete blades. Local, spatially-resolved and line-averaged distributions of surface adiabatic film cooling effectiveness and surface heat transfer coefficient ratios are provided for a range of local blowing ratios BR, with a ratio of tip gap to true blade span of 1.16 percent. Experimental and analytic procedures employed to obtain spatially-resolved film cooling surface data include infrared thermography, transient testing techniques, and the impulse response method for transient data analysis.

Results show that spatially-resolved surface thermal protection changes significantly as hole placement and flow condition of the upper pressure side film cooling are altered. Associated effectiveness values, along the upper pressure side of the turbine blade, vary in a significant manner as blowing ratio changes, with different characteristics depending upon upper pressure side film cooling hole placement. Along the tip region of the blade, line-averaged adiabatic film cooling effectiveness often increases with increasing blowing ratio for the pressure side rim. Effectiveness data for the suction side rim generally show more complicated variations as blowing ratio changes, also with significantly different variations as upper pressure side hole placement location is altered. Heat transfer coefficient data along the squealer tip surface and on the upper pressure side of the blade surface generally have variations which are similar to the baseline blade with no film cooling for many surface locations. Local deviations, when present, are due to locally augmented mixing and shear, and increased turbulent transport from the advective presence of the film coolant.

The influences of viscous dissipation within the turbine blade tip gap flow are quantified, which is vital to ascertain appropriate driving temperatures for convective heat transfer within such a high velocity, compressible environment. The influences of viscous dissipation effects are illustrated by adiabatic surface temperature magnitudes, measured with no film cooling, which, when considered relative to flow stagnation temperature, are directly related to local Mach number values within the tip gap flow along the blade tip surface. Adiabatic surface temperature variations with film cooling are then provided relative to local baseline values with no film cooling. The result is local adiabatic film cooling effectiveness and local heat transfer coefficients which are due to thermal film effects only, and are based entirely upon locally measured temperatures (without the use of global temperature parameters).

## Biography:

Dr. Phil Ligrani is currently the Eminent Scholar in Propulsion, and Professor of Mechanical and Aerospace Engineering in the College of Engineering at The University of Alabama in Huntsville. Prior to August 2014, Dr. Phil Ligrani was the Oliver L. Parks Endowed Chair, and Professor of Aerospace and Mechanical Engineering at Parks College of Saint Louis University. Prior to that appointment, he was the Donald Schultz Professor of Turbomachinery in the Department of Engineering Science at the University of Oxford. There, from 2006 to 2009, he was also Director of Oxford University's Rolls-Royce UTC (University Technology Centre) in Heat Transfer and Aerodynamics. From 1994 to 2006, he was a Professor of Mechanical Engineering, Adjunct Professor in the Department of Bioengineering, Director of the Convective Heat Transfer Laboratory, and Associate Department Chair in the Department of Mechanical Engineering at the University of Utah. Research interests include turbomachinery, convective heat transfer, fluid mechanics, transonic, supersonic, and hypersonic flows, as well as micro-fluidics, and measurement technologies.

Some of his recent honors, awards, and academic recognitions include:

. 2020 College of Engineering Outstanding Faculty Member Award. University of Alabama in Huntsville.
. 2020 Undergraduate Research and Creative Activity Mentor Award. University of Alabama in Huntsville.
. 2020 Hermann Oberth Award. AIAA – American Institute of Aeronautics and Astronautics.
. 2020 Employee Service Award. University of Alabama in Huntsville.
. ASME IGTI Outstanding Service Award 2019.
. 2019 University Distinguished Research Award for Excellence. University of Alabama in Huntsville.
. Outstanding Senior Faculty Member Award for 2019. College of Engineering, University of Alabama in Huntsville.
. 2019 to Present. Member. European Union Academy of Sciences (EUAS).
. 2019 to Present. Guest Professor. School of Mechanical Engineering, Shanghai Jiao Tong University.
. Outstanding Mechanical Engineer of the Year Award 2016. American Society of Mechanical Engineers.
. 2010 to 2022. Distinguished Advisory Professor. Inje University, South Korea.
. Distinguished Lecture Award, 2011, University of Wisconsin, Milwaukee.
. Distinguished Editorial Review Board Membership, Springer Publishing Corporation.
. Carl E. and Jessie W. Menneken Faculty Award for Excellence in Scientific Research.
. NASA Space Act Tech Brief Award.
. Silver Winner, Annual 26th Educational Advertising Awards.

# *Speakers*

## *Forecasting the Output Power of Photovoltaic Panels using Artificial Intelligence Approaches*

**CHAHBOUN Souhaila**
Mohammadia School of Engineers, Mohammed V University in Rabat, Rabat, Morocco

**Abstract:**

One of the most promising green energy sources is solar energy. Due to the numerous improvements in Photovoltaic (PV) technology, which have resulted in the creation of more effective PV solar panels and a significant decrease in their price, its market share is expanding rapidly. However, meteorological factors like temperature and sun irradiation have an impact on the solar energy produced. Large-scale solar energy grid integration is badly impacted by this fluctuation. For the successful integration of solar power into the electrical grid, accurate forecasting of the power provided by PV systems is required. The aim of this work is to investigate the potential for applying machine learning techniques to accurately forecast the solar PV power generated, allowing for improved exploitation of this green source.

**Biography:**

CHAHBOUN Souhaila got her PhD in 2022 in Artificial Intelligence from the Mohammadia School of Engineers in Morocco. In addition to her engineering degree in the electrical field, she got a master's degree in mobility and electric vehicles in 2017 from 4 of the top engineering schools in France. Her professional career started at the Renault Technocentre in Paris as an electronic development pilot. Later, she joined the Renault Tangier plant in Morocco in 2018. During her research career, she published several papers and participated in several conferences to present her research work on photovoltaic power prediction using machine learning algorithms.

**Edgar Harzfeld**
Professor, Stralsund University of Applied Sciences.

**Abstract:**

The decline of fossil fuels requires the expansion of renewable energy production. The use of wind and pv energy is associated with strong fluctuations that are insufficiently adapted to the demand. The use of storage systems can help to reduce the mismatch. While short-term storage systems such as batteries rely on charging and discharging cycles, long-term storage systems such as methanol storage can be charged and discharged over any time range. Current studies show a wide variety of possible applications for long-term storage systems based on methanol. Methanol can contribute to the decentralised supply of electricity, heat and fuel as well as to grid stabilisation. In an emergency case, it can even supply entire consumer clusters autonomously for several days.

**Biography:**

Edgar Harzfeld, Professor at Stralsund University. Studies and research in Leipzig and Zurich. Since 1996 at the Faculty of Electrical Engineering and Computer Science of Stralsund University responsible for electrical power supply and renewable energy systems. Since 2004 -2021 numerous research projects on the subject of electrical energy storage technologies.

## *Machine Learning Approaches to Neuroscience: Challenges and Opportunities in EEG*

**Giulia Cisotto**
Assistant Professor, Department of Informatics, Systems and Communication (DISCo), University of Milan-Bicocca.

**Abstract:**

Nowadays, machine learning (ML) is becoming pervasive in medicine, showing promising results and perspectives that opened the way to a new generation of e-health services. However, some relevant issues are still open. The talk will focus on the case of the analysis of multi-channel electroencephalography (EEG), the most common, non-invasive, low cost and highly temporally resolved electrophysiology technique. EEG is used in a number of contexts, i.e., from diagnostics to research on brain connectivity, to complement the new generation of exoskeletons to support gait.
However, common challenges are shared across different EEG applications: i.e., the automatization of its pre-processing with the critical dependence on the expertise of the operator performing it, the extremely low SNR (-10dB is a realistic value for EEG), a large variability across subjects as well as sessions or repetitions, the robustness of its use in more ecological contexts, i.e., out of the lab.
In the last decades, machine learning has proved to be very promising in addressing some of these issues with special attention to its ability to find complex patterns associated with pathologies or behaviors. This talk will present a number of studies where different ML and DL models have been used in EEG to cope with low SNR, to optimize pre-processing, to study inter-subject variability and to enhance the reproducibility of EEG analysis in ecological setups. Finally, the most promising future perspectives of ML for EEG analysis will be presented.

**Biography:**

Giulia Cisotto is Assistant Professor (non-tenure track) at the Dept. Informatics, Systems and Communication of the University of Milan-Bicocca since January 2022 (previously, Assistant Professor at the Dept. Information Engineering of the University of Padova). Since 2010, she has been deeply involved in the analysis of electrophysiological signals (e.g., EEG, EMG) using signal processing techniques and machine learning with the aim of supporting diagnostics, motor rehabilitation and neuroscience research. Most of these studies have been designed and performed in collaboration with clinical Institutes and healthcare companies, both in Italy and in Japan. She has authored several Journal papers, conference articles and three book chapters (Google Scholar: #citations = 397, h-index = 8), and she has been the recipient of an Outstanding Paper Award at IEEE Healthcom'18 and an Honorary Mention by the IEEE Communications Society in 2020. She has also been guest co-Editor for the book entitled "ICT for E-Health: Sensing, Data Analysis, Applications" (December 2021), edited by the National Inter-University Consortium for Telecommunications (CNIT). Since 2013, she has been actively involved in several national and international projects for the development of advanced data analytics for smart health and human-computer interaction (B-RELIABLE, Portugal, 2018-2022; SENIOR, Italy, 2018-2022; Handmade, Italy, 2018-2023; and others). More recently, she is working in the design, analysis, and optimization of new generations of smart greenhouses using machine learning to monitor the health conditions of plants and to minimize the consumptions of different resources (water, light, pesticides). This project is funded by PON Italian Initiative, with the collaboration of Seletech Engineering srl. Her current research interests are focused on machine learning, deep learning and explain ability algorithms to provide transparent and optimized solutions for health monitoring in ecological scenarios.

## *The Energy Efficiency of Building Components. The case of Historical Masonry Through a Multidisciplinary Approach*

**Marianna Rotilio**
Department of Civil, Construction-Architectural and Environmental Engineering, University of L'Aquila, Italy.

**Abstract:**

In the Italian context, about 65% of the buildings were built prior to the first law which introduced criteria for energy saving. According to Istat data, of the entire stock of historic inhabited buildings, almost two out of ten were built before 1919. This was the historical moment of the progressive abandonment of traditional construction techniques. In general, therefore, there are more than 2.1 million inhabited historic buildings. From a quantitative point of view, these buildings have a consistent "weight" in order to achieve the Sustainable Development Goal 7 set by the 2030 Agenda [1]. For this reason, a question to be answered concerns the search for compatible methods, techniques and intervention strategies to implement the energy efficiency of historic buildings, with the aim of responding to the sustainability demands of the international community. Many scholars have dedicated time and research to the topic of energy efficiency in buildings, but the study of the state of the art has highlighted the presence of numerous research gaps to be overcome. In light of the arguments, multidisciplinary research was developed to define strategies and methodologies to promote the energy efficiency of traditional masonry. This is a very complex issue; therefore, it was faced from three main points of view or topics: the lack of information regarding the thermal performance of the historic masonry [2]; problems relating to the compatibility of design interventions; analysis of the sustainability of design solutions from an environmental, energy, social and economic point of view [3].

**References:**

[1] V. Annibaldi, F. Cucchiella, P. De Berardinis, M. Gastaldi, M. Rotilio, An integrated sustainable and profitable approach of energy efficiency in heritage buildings, Journal of Cleaner Production, 251, 119516 (2020).
[2] V. Annibaldi, F. Cucchiella, P. De Berardinis, M. Rotilio, V. Stornelli, Environmental and economic benefits of optimal insulation thickness: A life-cycle cost analysis, Renewable and Sustainable Energy Reviews, 116, 109441 (2019).
[3] P. De Berardinis, M. Rotilio, C. Marchionni, A. Friedman. Improving the energy efficiency of historic masonry buildings. A case study: A minor centre in the Abruzzo region, Italy. Energy and buildings, 80C, 415-423 (2014).

**Biography:**

Marianna Rotilio is a senior researcher at the DICEAA Department of the University of L'Aquila, Italy. Her research has been focused on issues relating to building production and components, and in particular it was directed towards the analysis of the hygrothermal behavior of masonry; to technologies and processes for the reuse, re-manufacturing and recycling of building components; to the rationalized management of the on-site construction process and worker safety. The field of study is mainly that relating to historical and particularly complex contexts. During her research career, she published over one hundred papers and participated in several conferences.

**Dan Feldman**
Professor, Computer Science Department, University of Haifa, Israel.

**Abstract:**

A coreset (or, core-set) for a given problem is a ``compressed" representation of its input, in the sense that a solution for the problem with the (small) coreset as input would yield an approximate solution to the problem with the original (large) input. Using traditional techniques, a coreset usually implies provable linear time algorithms for the corresponding optimization problem, which can be computed in parallel, via one pass over the data, and using only polylogarithmic space (i.e, in the streaming model). During the recent years, coresets were suggested for problems such as $k$-means clustering, classification, facility location, linear regression, PCA, and matrix approximation.

**Biography:**

Prof. Feldman is the Director of the Robotics and Big Data Labs, Computer Science Department (University of Haifa) holds a Ph.D. in Computer Science from the TAU and did his post-doctoral studies at the Distributed Robotics Labs of MIT, and the CMI at the Caltech. He is a worldwide leader and main developer both in academy and industry for the research field known as core sets: a provably small and problem dependent data reduction. While the theory is based on deep computational geometry, (current\modern) applications include Machine and Deep learning of Big Data, Robotics, Computer Vision, Cybersecurity, and many more.

# *Synergy Between TMZ and Individualized Multimodal Immunotherapy to Improve Overall Survival of IDH1 Wild-Type MGMT Promoter-Unmethylated GBM Patients*

**Stefaan W. Van Gool,**
Jennifer Makalowski, Michael Bitar, Peter Van de Vliet, Volker Schirrmacher,
**Wilfried Stuecker.**
Immun-Onkologisches Zentrum Köln (IOZK), Hohenstaufenring 30-32, 50674 Köln.

**Abstract:**

The prognosis of IDH1 wild-type MGMT promoter-unmethylated GBM patients remains poor. Addition of Temozolomide (TMZ) to first-line local treatment shifted the median overall survival (OS) from 11.8 to 12.6 months. We retrospectively analyzed the value of individualized multimodal immunotherapy (IMI) to improve OS in these patients. All adults meeting the criteria and treated 06/2015-06/2021 were selected. Thirty-two patients (12f, 20m) had a median age of 47y (range 18-69) and a KPI of 70 (50-100). Extent of resection was complete (11), <complete (12) or not documented (9). Seven patients were treated with surgery/radio(chemo) therapy and subsequent IMI (Group-1); 25 patients were treated with radio chemotherapy followed by maintenance TMZ plus IMI during and after TMZ (Group-2). Age, KPI and extent of resection were not different amongst both groups. The median OS of group-1 patients was 11m (2y OS: 0%). Surprisingly the median OS of group-2 patients was 22m with 2y OS of 36% (CI95%: 16-57), which was significantly (Log-rank: p = 0.0001) different from group-1. The data suggest that addition of IMI after local therapy on its own has no relevant effect on OS in these GBM patients, similar to maintenance TMZ. However, the combination of both TMZ + IMI significantly improved OS.

**Biography:**

Stefaan Van Gool, MD, PhD, is a specialist in pediatric hemato-oncology with a focus on brain tumors. He is the Head of Translational Oncology at the IOZK. He spent many years at the University Clinic in Leuven and at the Department of Microbiology and Immunology, where he conducted research on the use of vaccines against cancer and published many studies. He leads the team of doctors at the IOZK and is responsible for planning and implementing the IOZK Immunotherapy.

**Denis Reilly**
JLiverpool John Moores University (School of Computer Science and Mathematics), UK.

**Abstract:**

Machine learning is transforming the way that we live and the technologies that we use through diverse applications such as healthcare, robotics and network security to name but a few. One area where machine learning can make significant contributions is that of decision support for emergency services (police, fire, ambulance). Machine learning excels at tasks such as classification, forecasting and prediction. Emergency services are required to respond to incidents, which require classification of the conditions and environment as well as forecasting and predictive capabilities to deal with the incident at hand. Machine learning can be used to effectively bolster existing emergency service decision support systems or serve as the basis for new decision support systems. The presentation will consider two areas of research, firstly, the use of Bayesian networks to provide decision support for police dealing with missing person cases, and secondly, the use of a random forest classifier for the classification of domestic fire injuries. In particular, the presentation will explore some of the challenges, such as dealing with large categorical datasets, which can affect accuracy. The presentation will also consider heuristics that can be used for selecting appropriate variable encoding methods and an appropriate machine learning algorithm from the many that exist.

**Biography:**

Denis Reilly graduated from the University of Liverpool with BEng (Hons) in Electrical and Electronic Engineering (first class) an MSc in Computer Science (Distinction) and a PhD in Middleware for Instrumentation. He is a Principal Lecturer in the School of Computer Science and Mathematics at Liverpool John Moores University. His research interests include Machine Learning, Internet of Things (IoT), Network Security, Robotics and AI. He serves on the editorial board for the Journal of Machine Learning Research and is a reviewer for IEEE Access, IEEE Transactions on Knowledge and Data Engineering and ACM Computing Reviews.

**Julian D. Colorado**
Associate Professor, Department of Electronics Engineering, Pontificia Universidad Javeriana, Bogota, Colombia.

**Abstract:**

The OMICAS Project is an international Alliance focused on consolidating and validating a multi-scale strategy and infrastructure to promote new discoveries in plant science and the development of new technological solutions for improving agricultural productivity and sustainability, by using high-throughput, real-time phenotyping technologies as well as experimental tissue characterization at different levels of the omics hierarchy and under contrasting conditions, to elucidate epigenome, genome, proteome- and metabolome-phenome relationships. In this regard, crop biomass is a crucial variable for enabling genomic-phenomics correlations. Traditional methods to measure spatio-temporal variations in biomass rely on a labor-intensive destructive sampling of the crop. Here, we present a high-throughput phenotyping approach for the estimation of Above-Ground Biomass Dynamics (AGBD) using an unmanned aerial system. Multispectral imagery was acquired and processed by using the proposed segmentation method called GFKuts, that optimally labels the plot canopy based on a Gaussian mixture model, a Montecarlo based K-means, and a guided image filtering. Accurate plot segmentation results enabled the extraction of several canopy features associated with biomass yield. Machine learning algorithms were trained to estimate the AGBD according to the growth stages of the crop and the physiological response to several rice genotype traits.

**Biography:**

Julian Colorado is an Associate Professor in the Department of Electronics Engineering at Pontificia Universidad Javeriana in Colombia. He completed his Ph.D. and M.S. in Robotics at Universidad Politecnica de Madrid, Spain, where he studied the development of novel Guidance-Navigation-Control (GNC) strategies for a diverse category of Unmanned Aerial Vehicles (UAV), including quadrotors and highly-articulated morphing-wing drones inspired by the biomechanics of bats. He was a visiting research fellow at Brown University, USA (2010-2011), where he studied how to integrate smart-actuators based on Shape Memory Alloys to control wing modulation in a bat-like robot. Julian Colorado research interests include the area of field robotics, GNC for UAV monitoring, robot dynamics and control. Also, bio-inspired robotics, bioengineering, and soft robotics

**Emily M. Hand**
Assistant Professor, Computer Science and Engineering 1664 N. Virginia Street, Reno.

**Abstract:**

Dr. Hand's long-term research vision is to build a wearable device that can provide individuals with feedback that improves their social interactions. The ideal users of this system are individuals on the Autism spectrum or those with visual impairments. There is a significant body of work on navigation for the visually impaired, but most of life exists outside of getting from point A to point B. Dr. Hand's research group, the Machine Perception Lab, seeks to improve the quality of life for these individuals by focusing on social interactions. This involves understanding faces, body language, and spoken words. Her group has several active research projects towards this goal, including recognizing first impressions from faces, describing faces, recognizing micro-expressions, summarizing text and identifying sarcasm.

**Biography:**

Dr. Emily Hand is an Assistant Professor in Computer Science and Engineering at the University of Nevada, Reno. Her research interests lie at the intersection of machine learning and human perception. She is the director of the Machine Perception Lab at UNR. The lab's goal is to develop technology capable of improving social interactions for individuals with visual or developmental disabilities. She received her PhD in 2018 from the University of Maryland, College Park.

## *Exploring Structural Quality of Python Open-Source Systems*

**Safwan Omari**
Professor, Engineering, Computing and Mathematical Sciences, Lewis University, Romeoville, IL, USA.

**Abstract:**

Software systems are living organisms, which need constant maintenance and go through never-ending cycles of evolution. An accurate assessment and understanding of a system's quality posture at any moment is key to the identification of rough spots in the code that need attention and to ensure a healthy evolution. In this talk, we will discuss several research projects that we are actively working on, our work is focused on harvesting various types of software metrics for large-scale Python software systems, exploring correlations among different metrics, and studying their effectiveness in guiding the team's effort in software evolution. In one effort, we investigate relationship between two widely used metrics; Maintaining Index and Pylint refactor score, one would reasonably assume that there must be some correlation between them, preliminary results will be presented and discussed.

**Biography:**

Safwan Omari is a Professor of Computer Science and Director of the MSCS program at the Department of Engineering, Computer and Mathematical Sciences at Lewis University. He received his Ph.D. in Computer Science from Wayne State University in 2009. His research interests include wireless sensor networks, distributed systems, computer security, and most recently, software quality metrics. Dr. Omari has several publications in international conferences and workshops. He is involved in computer science education, curriculum development and computing programs accreditation. Besides his career in academia, Dr. Omari strives to stay active in the industry, where he occasionally works on the development of software systems and provide consulting services to technology startups.

# *Poster*

# *Enabling Wireless Communications in On-Chip and In-Package Networks*

**Josep Solé-Pareta**
Universitat Politècnica de Catalunya, Barcelona, Spain.
**Sergi Abadal-Cavallé**
Universitat Politècnica de Catalunya, Barcelona, Spain.

## Abstract:

The aim of this Abstract is summarize the research directions and main achievements of WiPLASH European project [1], which will be what we will present in the Global Experts Conference on Applied Science, Engineering and Technology in a Poster format. WiPLASH is pioneering on-chip wireless communications as a disruptive enabler towards next-generation computing systems for artificial intelligence (AI), and its main goal is the investigation and evaluation of key technologies for wireless communication among on-Chip and in-Package processing elements. Aiming to introduce novel wireless communication planes able to provide architectural plasticity, this is, reconfigurability and adaptation to the application requirements, achieving very high performance without any loss of generality. A core contribution of WiPLASH is the evaluation of the system and application-level benefits deriving from wireless
communication planes (Fig. 2).

In the Poster, we will outline the innovations pursued by the project consortium, centering on key hardware and software enablers for wireless communication at the chip scale: Integrated antennas and Communication protocols.

## On-chip Antennas:

WiPLASH propose and demonstrate the use of graphene-based antennas enabling point-to-point and broadcasting communication modes among multiple chiplets embedded in heterogeneous systems, as illustrated in Fig. 1(a) [2].

## Communication protocols:

Developing a wireless network requires, besides the antennas and other RF hardware, a protocol stack that manages the communication. WiPLASH work mainly revolves around designing the strategy for Medium Access Control (MAC), and network-level aspects such as routing and load balancing.

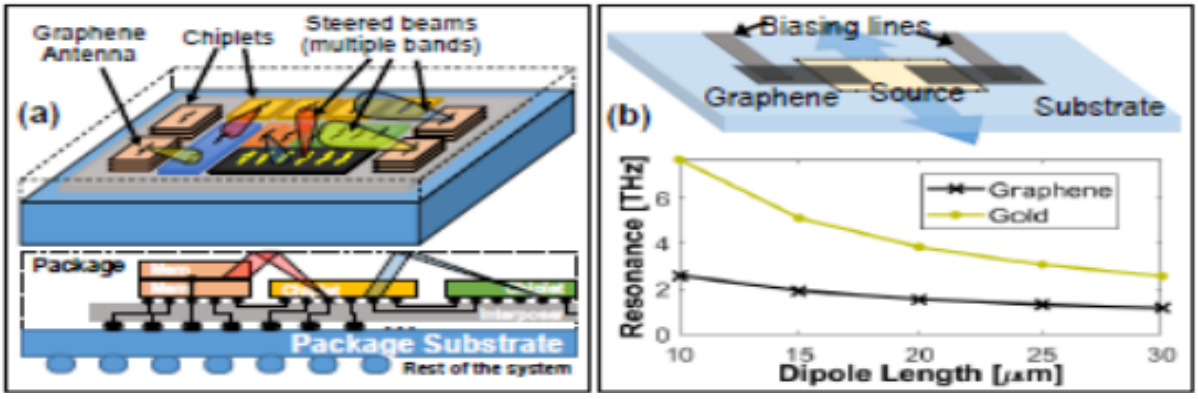


**Figure 1:** (a) Graphene antennas integrated within chiplets in a heterogeneous architecture, enabling reconfigurable links in frequency and direction of radiation. (b) Schematic of a simple graphene dipole and simulated proof of miniaturization.

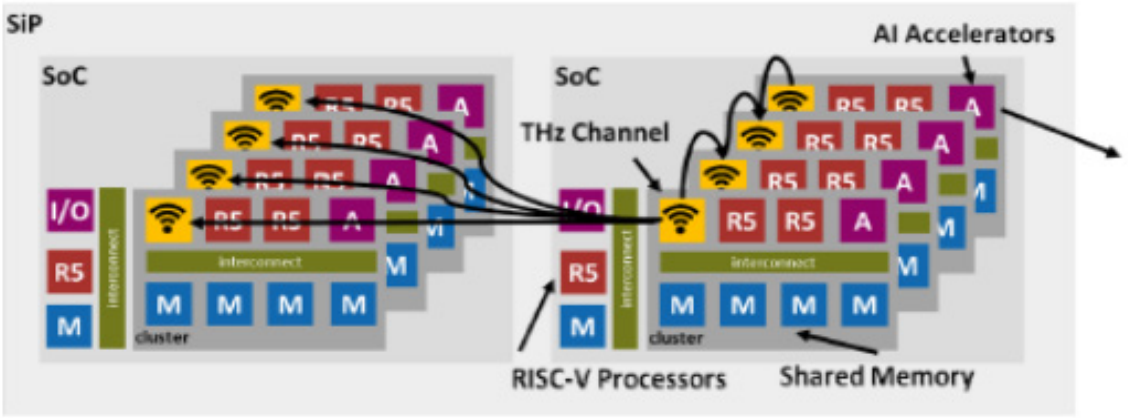



**Figure 2:** The WiPLASH European project aims at developing Massively Parallel Heterogeneous Architecture, exploiting Wireless THz Channels for Cluster-to-Cluster and Chip-to-Chip communication.

[1] WiPLASH: Wireless Plasticity for Massive Heterogeneous Computer Architectures. https://www.wiplash.eu/ European Union's Horizon 2020 grant agreement No 863337.

[2] Sergi Abadal et al. 2020. Graphene-based Wireless Agile Interconnects for MassiveHeterogeneous Multi-chip Processors. arXiv preprint arXiv:2011.04107 (2020).

## Biography:

Prof. Josep Solé-Pareta obtained his M.Sc. degree in Telecom Engineering in 1984, and his Ph.D. in Computer Science in 1991, both from the UPC. In 1984 he joined the Computer Architecture Department of UPC. Currently, he is a Full Professor in this department. He did a Postdoc stage at the Georgia Institute of Technology during the summers of 1993 and 1994. In 1995 he was co-founder of the centre UPC-CCABA and, more recently, in 2008, he co-founded the UPC-N3Cat. His current research interests are in Nano-networking Communications, Traffic Monitoring and Analysis, High Speed and Optical Networking, and Energy Efficient Transport Networks, with an emphasis on traffic engineering, traffic characterization, MAC protocols, and QoS provisioning. His publications include several book chapters and more than 350 papers in relevant research journals (> 90) and refereed international conferences. He has participated in many European projects in the Computer Networking field. He was Local Chairman of the 25th Conference on Computer Communications (EEE INFOCOM 2006) held in Barcelona on April 23-29, 2006, and General Chairman of the 7th International Conference on Transparent Optical Networks (ICTON 2005, Barcelona, July 3-7, 2005), and of the 5th. Workshop on Quality of Future Internet Services (QofIS'04, Barcelona, September 29-30 and October 1, 2004). Currently, he is a member of the N3Cat and the IDEAI-UPC.

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