# ABSTRACTS & BIOSKETCHES

## ABOUT THE UNIVERSITY OF MONTENEGRO

The University of Montenegro is the oldest and the only state university in Montenegro that provides comprehensive education in the fields of social, humanistic, technological, natural, and medical sciences.

It was founded in 1974, with the belief that it would educate professionals essential for the dynamic socio-economic and cultural development of Montenegro. At its inception, it consisted of three faculties: Economics, Technical Sciences, and Law.

Today, on the eve of celebrating its 50th anniversary in 2024, the University of Montenegro comprises 19 faculties and three scientific institutes: the Historical Institute, the Institute of Marine Biology, and the Institute for Advanced Studies. The university accommodates around 20,000 students across Montenegro.

The teaching is structured in accordance with curricula from esteemed European higher education institutions, facilitating smooth mobility for students and academic staff through more than 150 signed agreements within the Erasmus+ program, as well as over 80 bilateral agreements.

It strengthens its position in the realm of science through international cooperation and project activities aimed at supporting research capabilities. As a central institution for science, culture, and the arts in Montenegro, it consistently builds connections with the business, social, and international sectors through productive collaboration with the business and public sectors.

The University of Montenegro is a member of prestigious international organizations, such as:

- *The European University Association*
- *Magna Charta Universitatum*
- *The Francophone University Association*
- *The University Network of the Adriatic Ionian Initiative*
- *Network of Universities of Small Countries and Territories*
- *The Balkan University Association*
- *Ulysseus European University*
- *European Security and Defence College*

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## Dusica Babovic-Vuksanovic
Professor in Medical Genetics and Pediatrics, Consultant in the Department of Clinical Genomics, Mayo Clinic, Rochester, USA

### Advances in Management of Neurofibromatosis Type 1

**Abstract:** Neurofibromatosis type 1 (NF1) is an autosomal dominant condition characterized by pigmentary skin changes and a variety of associated complications including tibial dysplasia, optic glioma, scoliosis, developmental difficulties and predisposition for development of tumors. Diagnosis is based on clinical criteria and/or genetic testing. NF1 is caused by deficiency of neurofibromin, a tumor suppressor gene with consequent activation of RAS pathway. Management of NF1 had been limited to observation, surgery and symptomatic therapies due to lack of effective treatments. Recent advances have led to the first approved medical therapy for patients with plexiform neurofibromas, and the progress has been made on development of additional drug treatments for plexiform neurofibroma and for other NF1-related complications.

**Bio:** Dusica Babovic-Vuksanovic is a Professor of Pediatrics and Medical Genetics. She has been a staff of Mayo Clinic in Rochester, MN since 1999. She carried on multiple leadership positions including a role of Chair of the Department of Clinical Genomics, Residency Program Director, member of the IRB Board, and member of the Executive Committee of the Center for Individualized Medicine at Mayo. Currently, she is serving as a Director Neurofibromatosis Program at Mayo Clinic and Director of the Mayo Clinic Center of Excellence for Rare Disease, Scientific Adviser to Children's Tumor Foundation and many other extramural activities in national medical organisations. She is conducting multiple clinical trials for patients with neurofibromatosis and schwannomatosis. Dr. Babovic-Vuksanovic has more 150 peer reviewed manuscripts and book chapters, many national and international presentations and visiting professorship.

## Zoran Babovic
School of Computing, Union University & Innovation Center of the School of Electrical Engineering University of Belgrad, SRB

### Applications of Deep Learning in Enhancing Database Query Execution

**Abstract:** Recent research in database management systems (DBMS) has been significantly influenced by developments in machine learning (ML), particularly deep learning. These advancements have led to the application of various ML algorithms, especially deep learning models, to enhance the efficiency of query optimizers. This presentation summarizes approaches that employ deep learning algorithms at various levels within the query execution engine, targeting index structures, query plan execution, and externally controlling query optimizers through parameter tuning. Specifically, it addresses the challenges that need to be overcome, such as latency, model generality, and initial training samples, which arise when implementing deep learning algorithms in DBMS..

**Bio:** Dr. Zoran Babovic holds a PhD in Computer Engineering from the School of Electrical Engineering, University of Belgrade. He is an assistant professor at the School of Computing, Union University, and a research associate at the Innovation Centre, School of Electrical Engineering, University of Belgrade. His research focuses on data management, the Internet of Things, high-performance systems, and machine learning applications. He has gained experience through EU-funded research projects and collaborations with US and UK companies. His research has been funded by the Serbian Ministry of Science for over 10 years, and he has participated in six innovation projects funded by the Serbian Innovation Fund.

## Dusan Barac
Full Professor at FON, University of Belgrade and Vice-Dean for Digital Development, SRB

### Digital Transformation and Digital Business Ecosystems

**Abstract:** This lecture aims to explore the intricate landscape of digital ecosystems, a domain where businesses, customers, and technologies converge to foster innovation and generate value. The presentation will place a strong emphasis on the phenomenon of digital transformation, which is reshaping industries and altering competitive landscapes. We will discuss opportunities and challenges inherent in the dynamic nature of contemporary digital business ecosystems. Through a multitude of practical examples, we will illustrate how organizations navigate these complex environments, leveraging digital tools and strategies to enhance their operations and achieve sustainable growth. The role of the advanced technologies will be described in details.

**Bio:** Dusan Barac is a Full Professor at FON, University of Belgrade and Vice-Dean for digital development. He participated in numerous IT-related projects, both outsourcing and developing IT solutions, playing different roles from business consultant to software engineer. He has 15+ years of consultant experience in areas such as IT projects, building e-commerce and e-business solutions, digital transformation, CRM, web and mobile apps development, and establishing advanced e-learning systems. His main interests are: digital transformation, e-commerce ecosystems, web and mobile development, IT project management, e-learning systems and digital startups. He published a big number of papers, where 25+ are from leading journals with an impact factor.

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## Sanja Bauk

The Estonian Maritime Academy, Tallinn University of Technology (TalTech), EST

### Challenges of Digital Transformation in Maritime Affairs

**Abstract:** This study focuses on the digital transformation of shipping and port logistics. Integrated navigation bridges, automation of power supply, propulsion and manoeuvring systems on board are considered. Surface and underwater vessels with different levels of autonomy, including digital twins are within the scope. Maritime cloud, internet of everything, big data, and federated learning are analysed. Smart ports, shore- and space-based control centres shall be involved. The challenges of such a huge technological leap in maritime will be highlighted.
Key words: maritime affairs, digital transformation, challenges.

**Bio:** Sanja Bauk is a research professor at the Estonian Maritime Academy with Tallinn University of Technology. In addition to research, she teaches Introduction to Computer Systems for Maritime Specialist and Maritime Industry's Digital Transformation modules. Previously, she was a professor at the Durban University of Technology in South Africa, where she was a researcher and lecturer in Electronic Navigation, Logistics and Research Methodology. She started her career at the Maritime Faculty Kotor with University of Montenegro, where she taught Operations Research and Information Technologies in addition to research. Her research interests are multi-layered with a focus on maritime digital transformation.

## Predrag Bjelic

Professor of International Trade and PhD in Economics, University of Belgrade Faculty of Economics and Business, SRB

### Deglobalisation and Global Value Chains in International Trade

**Abstract:** Due to unprecedented liberalisation of international trade regime in the second half of the 20th century the specific structure of international cooperation has emerged. Production has been disintegrated and separate phases of production process have been relocated to different countries. On the other hand international trade has become more integrated and focused more on trade of intermediary products. This structure is refered to as Global Value Chains (GVC). But in the last decede the confrontation between global trade powers, USA and Chaina, have started the process of deglobalisation, putting a lot of strain on GVC and possibly could lead to establishment of regional value chains. Key words: Deglobalisation, Global Value Chains, Trade.

**Bio:** He is a professor of international trade and EU economics at the Faculty of Economics, University of Belgrade. He teaches the courses International Economics and Management in a Global Context in the English program of LSE studies. Visiting professor at the Faculty of Economics, University of Montenegro. He is the president of the Committee for Doctoral Studies and a member of the Expert Council of Legal and Economic Sciences of the University of Belgrade. He lectured at many faculties throughout the region of Southeast Europe. Predrag Bjelic is an expert of the World Trade Organization and the UN Conference on Trade and Development (UNCTAD). He has published several books and over a hundred articles. He studied at the London School of Economics, London, UK; Harvard University, Cambridge, USA and Faculty of Economics University of Oslo , Norway.

## Srdjan Djurovic

Department of Medical Genetics, Oslo University Hospital – Ullevål, Oslo and University of Bergen, Bergen, NOR

### Induced Pluripotent Stem Cells (iPSCs) Technology and Precision Psychiatry

**Abstract:** Neuropsychiatric disorders are recognized as leading causes of disability and morbidity globally. However, their pathophysiology is largely unknown and their clinical management is limited. The scarcity of disease models (poor accessibility to brain tissue and the lack of proper animal models) restricts capacity to evaluate the biological processes fundamental to these disorders. Induced pluripotent stem cells (iPSCs) technology emerged as a powerful technique for disease modeling and drug discovery, and it holds great promise for bridging the gaps between patients, genetics, and biology. Current capabilities and further developments needed, potential pitfalls, and the establishment of relevant clinical implications will be discussed.

**Bio: Research interests:** Molecular mechanisms in psychiatry, Modeling psychiatric disorders using induced pluripotent stem cells (iPSC) technology and Functional genomics in psychiatry. **Education:** Doctor of Medical Sciences (Dr. Sci.Med., Ph.D.), University of Zagreb, Croatia and University of Graz, Austria, Specialist in Medical Biochemistry & Clinical Laboratory Diagnostics and M.Sc. in Biology-Biomedicine, University of Zagreb, Croatia. **Current and previous positions:** Group leader, Department of Medical Genetics, Oslo University Hospital Ullevål, and Professor, Institute of Clinical Medicine, University of Bergen, Norway and Postdoctoral fellow, Institute for Medical Biochemistry, School of Medicine, University of Graz, Austria, The total number of publications : 362. Hirsch Index : 98.

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## Mensur Dlakic
Montana State University, USA

### Microbial Virulence and Disease Pathogenesis by the Cytholethal Distending Toxin

**Abstract:** Cytolethal distending toxins (CDTs) are made by many Bacteria, including human and animal pathogens. CDTs cause cellular distention, arrest in the $G_2/M$ phase and a loss of cell vitality. We uncovered the molecular mechanisms used by CDTs to intoxicate multiple cell types. Using genetic, immunological, cell biology and bioinformatics approaches, we established that CDT is a potent virulence factor that weakens host defenses by: 1) disrupting epithelial barriers; 2) suppressing acquired immunity; 3) promoting pro-inflammatory responses. Our work supports the phosphatase activity of CDT's B subunit, which perturbs the Akt signaling pathway. Our multipronged approach will provide solutions that neutralize the virulent activity of CDT pathogens.

**Bio:** Mensur Dlakic was born in Bijelo Polje, where he attended elementary and high school. He was granted a college degree in Molecular Biology and Physiology from the University of Belgrade. He obtained a PhD in Biochemistry for studies of DNA structure at the University of Nevada, Reno. After postdoctoral training in Cell Biology and Bioinformatics, Professor Dlakic moved to his current faculty position in Microbiology & Cell Biology department at Montana State University, Bozeman. Mensur authored >50 publications, has received NSF and NIH funding, and is on editorial boards of Frontiers in Genetics, Protein Bioinformatics and Cellular & Infection Microbiology.

## Vladimir Dragovic
The University of Texas at Dallas, USA

### Geometry of the Lasso

**Abstract:** We provide a geometric approach to the Lasso as a regression shrinkage method in linear regression. We derive closed formulae for the solution of the Lasso. Our method of solving the Lasso does not assume iterative numerical procedures and it is, thus, computationally more efficient than the existing algorithms for solving the Lasso. We also establish several important general properties of the solutions of the Lasso. We illustrate the results using real data examples as well as especially crafted examples with hypothetical data and compare with the solutions in the R. This is based on a joint work with Borislav Gajic.

**Bio:** Dragovic's research is in Integrable Systems. He received PhD from University of Belgrade in 1992 with Professor Dubrovin as the advisor. He published about 100 papers and two research monographs. He received the Award of the Union of the Mathematical Societies of Serbia and Montenegro for the best achievement of a mathematician younger than 40 (2001-2004) and the City of Belgrade Annual Awarad for Natural and Technical Sciences for 2010. Dr Dragovic is a Professor and Head of the Department of Mathematical Sciences at the Univeristy of Texas at Dallas. He has been a Professor of the MISANU, Belgrade, was Director of Mathenatical High School, Belgrade and a visiting Professor at University of Montengro (2003-2008). He is a leading co-author of three current official text-books for Mathematics in Montenegro. He delivered more than 200 invited talks including three at the Montenegrin Academy of Sciences and Arts.

## Vladimir Filipovic
Faculty of Mathematics, University of Belgrade, SRB

### Topological Genetic Algorithms – Initial Idea and Conceptual Design

**Abstract:** Optimization is a field at the intersection of mathematics, computer science and operations research that studies methods to find the best solution(s) according to a criterion. Metaheuristics are used to solve complex optimization problems. Understanding complex relationships between local optima can be helpful in navigating optimization metaheuristics to efficiently traverse the search space of the optimization problem. In this paper, a novel metaheuristic method, named Topological Genetic Algorithms, is proposed and its conceptual design is given. The proposed method extends Genetic Algorithms by incorporating elements of algebraic topology into its design.

**Bio:** Vladimir Filipovic was born on 1968, in Podgorica, Montenegro. He started the Computer science studies at Faculty of Mathematics, University of Belgrade in 1987, where he obtained BSc (1993), MSC (1998) and PhD (2006) in Computer Science. Since 1993 he has been working at the Department for Computer Science, Faculty of Mathematics, University of Belgrade, Serbia. From 2007 until 2016 he was the Head of the Software Examination and Certification Laboratory, from 2008 until 2011 he was Vice Dean for Academic Affairs. He is currently (since 2021) the Head of the Department for Examination and Control within the Faculty.

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## Mujë Gjonbalaj
University of Prishtina, KOS

### Plave Gusinje: The Basin of Natural Resources and its Role in Economic and Social Development

**Abstract:** This paper delves into the development challenges faced by the Plav and Gusinje region, despite its abundance of natural resources. Through a three-step approach involving indicator selection, data collection, and evaluation, it analyzes how these resources can significantly impact development. Using data from MONSTAT and other credible sources, the study calculates development indices for 21 municipalities in Montenegro and 23 settlements in Plave and Gusinje. Findings, presented via tables, statistical indicators, graphs, GIS and cartographic methods, reveal that despite their natural wealth, Plave and Gusinje lag far behind Montenegro's average development level, showcasing widening disparities. Keywords: Natural Resources, Economic Social Development, Development Disparities, GIS Mapping

**Bio:** Born on April 23, 1956, in Vuthaj, Plav, Montenegro, he completed his primary education in his hometown and finished his secondary education in Peja in 1975. He earned his degree in Economics from the University of Prishtina in 1979. In 1984, he obtained his Master's Degree from the University of Zagreb, focusing his thesis on the impact of external migration on Kosovo's economic development. He completed his Doctoral studies (Ph.D) at the University of Prishtina in 1995. From 1980 to 1997, he worked at the Economic Institute of Prishtina. From 1995 to 1997, he served as a chief editor of the scientific magazine "Economia". Joined the University of Prishtina as a Professor in 1997. Also held positions as Deputy Minister and Advisor within the Kosovo Government. He has authored or co-authored six monographs and University textbooks, and has published 38 scientific papers. His collaborations extend to various international organizations, including USAID, GIZ, DfID, Intercooperation, IBRD, and FAO.

## Branka Jokanovic
Global Automotive Solutions Architect, USA

### Advanced Driver Assistance Systems

**Abstract:** ADAS (Advanced Driver Assistance Systems) aim to improve road safety and driving experience. The primary challenge lies in accurately perceiving the environment and making real-time decisions based on sensor data. Current ADAS solutions rely heavily on radars, lidars, and cameras to detect obstacles, lane markings, and traffic signs, utilizing machine learning algorithms for perception and decision-making. However, these on-board systems have computational limitations and hardware constraints. The future of ADAS lies in leveraging cloud computing, where powerful remote servers process sensor data, enabling more advanced algorithms, over-the-air updates, and improved scalability. By offloading computations to the cloud, we are paving the way for safer vehicles.

**Bio:** Branka is a Global Solutions Architect for the automotive industry, focusing on solutions for autonomous vehicles. After completing her Bachelor's and Master's studies at the Faculty of Electrical Engineering, University of Montenegro, she moved to the United States to pursue a doctoral degree. She obtained her Ph.D. in radar systems from Villanova University in Pennsylvania. As an academic researcher, she worked on several projects involving radar systems and machine learning. Transitioning to the industry, she focused on the automotive sector, leveraging cutting-edge research both in the research&development phase, as well as the production. Her work has resulted in highly cited publications, patents, and trade secrets.

## Mijat Kustudic
School of Media and Communication, Shenzhen University, CHN and School of Computing, Union University, Belgrade, SRB

### Selected Issues in AI

**Abstract:** The rise of AI, particularly large language models, unlocks a new era of intelligent investing and robust investor protection. Our data-driven approach leverages the DIKW pyramid, analyzing information across all levels – raw data to extracted wisdom. This comprehensive analysis is overseen by an expert system. It meticulously scrutinizes assets, financial products, brokers, peers, and other key indicators against established rules and benchmarks. By identifying potential red flags related to value and safety, this approach empowers investors with a comprehensive framework for informed decision-making. This, in turn, generates value by enhancing protection and guiding investors towards smarter choices.

**Bio:** Mijat Kustudic earned his Ph.D. in Economics from Shenzhen University, China, focusing on the application of Artificial Intelligence across various fields. He led two teams in UNESCO's IRCAI Top 100 AI project list, addressing the United Nations Sustainable Development Goals. He won a silver medal in the Internet International Innovation Competition, organized by the Chinese Ministry of Education, and participated in the European Union-funded IPA Cross-Border Cooperation research projects. Currently, he holds two positions as a postdoctoral researcher at the School of Media and Communication, Shenzhen University, China, and the School of Computing, Union University, Serbia.

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## Filip Markovic
Max Planck Institute, GER

### Selected Issues in Contemporary Cyber-Physical Systems (CPS)

**Abstract:** As contemporary cyber-physical systems (CPS) grow in complexity, traditional methods for assessing and improving their timing-related safety properties are progressively less effective. There is a pressing need for innovative timing analysis and scheduling algorithms capable of rigorously addressing the intricate timing behavior of modern systems, making their inherent uncertainty and randomness both predictable and controllable. The urgency is underscored by the rising incidence of timing safety issues in the autonomous vehicles and space industry. My research focuses on probabilistic and statistical approaches to timing analysis and design of CPS, aiming to bridge the disconnect between current methodologies and the demands of modern systems.

**Bio:** I am a postdoctoral researcher at the Max Planck Institute for Software Systems (MPI-SWS) in Kaiserslautern, Germany. I was a postdoctoral researcher at Mälardalen University in Sweden (2020-2022), where I obtained my PhD in 2020 and MSc in 2015. I completed my Bachelor's degree at the Faculty of Information Technologies, Mediterranean University. My research resolved a long-standing open problem from 1995 on the probabilistic analysis of dependent execution times in real-time systems. My work received an outstanding paper award at ECRTS, a top conference in real-time systems research. In 2022, I earned the best presentation award at RTSS, the leading conference in the field.

## Tijana Markovic (née **Vujicic**)
Mälardalen University, SWE

### Selected Issues in Machine Learning

**Abstract:** The vulnerability of important data is increasing every day with the constant evolution and rise of sophisticated cyber security threats that can significantly impact various processes and systems. Defense mechanisms must quickly adapt to these new threats to ensure network security and protect sensitive data from exposure. My research focuses on applying machine learning techniques to detect cyber threats, emphasizing distributed and federated solutions, as well as edge machine learning. These approaches are particularly recommended for applications where the data cannot be centralized, and it is crucial to preserve data privacy and prevent network overload.

**Bio:** Tijana Markovic (née Vujicic) is a postdoctoral researcher at Mälardalen University in Sweden, within the Computer Science and Engineering department. She has an Associate Professor position at Faculty of Information Technologies at Mediterranean University in Montenegro. She received the BSc degree in software engineering from Mediterranean University, in 2012, and the MSc and the PhD in software engineering from University of Belgrade, in 2015 and 2018, respectively. Her research covers machine learning and its applications in different domains.

## Andjela Martinovic
Peak Bridge VC, ITA & MNE

### Probiotic Landscape: Challenges, Experience & Vision

**Abstract:** The probiotic market witnessed significant growth due to increased scientific evidence and demand for health-based products. However, the probiotic industry faces numerous challenges starting from strain identification and development, through the production process, and finally maintaining probiotic viability and functionality when reaching the human gastrointestinal tract. During the presentation, we will address how author's personal experience contributed to overcoming some of the main challenges within the probiotic field. Finally, the future perspectives and vision on probiotics will be given by highlighting the importance of personalized, cross-collaborative, and interdisciplinary approaches.

**Bio:** Andjela was born in Cetinje. She is a Scientific Analyst and Researcher, and a Co-Founder of the NGO Montenegrin Scientific and Technological Hub epiSTEMe. She holds a PhD in Food Systems, with expertise in Probiotics & Gut Health, from the University of Milan (Italy). She earned MSc in Mediterranean Organic Agriculture at the research institute CIHEAM – Bari (Italy), and a BSc in Food Technology at the Faculty of Food Technology, Food Safety, and Ecology, University of Donja Gorica (Montenegro). She is the author and co-author of papers published in prestigious scientific journals. Andjela is committed to advancing science and innovation across various domains, from Food & Health Tech to STEM education initiatives.

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## Miodrag Mateljevic
Serbian Academy of Science and Art, SRB

### Hyperbolic Geometry, Geometry of Minkowski Space and Special Relativity

**Abstract:** We review basic property of the flat geometry based on everyday intuition which is called Euclidean geometry (or parabolic geometry), and the non-Euclidean geometries which is called hyperbolic geometry (or Lobachevsky-Bolyai-Gauss geometry), and Minkowski geometry which is related to Einstein's Postulate 2: The speed of light in vacuum is the same for all observers, regardless of the motion of light source or observer as well connections between these geometries. In particular, we try to make a mathematical model motivated by the special theory of relativity,without using the second postulate of Einstein, and to consider it. We try to conclude that the two way speed of light is invariant.

**Bio:** Professor Miodrag Mateljevic was born on November 28, 1949 in Valjevo. All his degrees are from the University of Belgrade in Mathematics. His research span is wide, from Complex Analysis to Relativity Theory. He was on postdoc or faculty positions in a number of universitues in the USA: University of Wisconsin in Madison, University of Pittsburgh, Wayne State University, etc... He was the mentor for a number of successful matematicians in Montenegro and Worldwide, now members of prestigeous institutions in science, like British Royal Society, GBR, or in industry, Presidency of Black Rock, USA, etc....

## Avi Mendelson
Technion, CS department, ISR

### Selected Issues in Computing

**Abstract:** The Middle Ages allowed a few selected influential people to flourish, taking advantage of the ignorance of the rest. Today, data drives the world via LLM-based systems like ChatGPT. Developing and training such systems is extremely expensive; only prosperous people and companies can own them. It allows a few interested people to control the majority. I believe that the primary mission of my community is to find new methods and tools to prevent the distribution of false information and allow accurate knowledge to be learned and delivered at a fraction of the cost and resources so that the majority can continue controlling their lives.

**Bio:** Avi Mendelson is a professor at the CS department at Technion and an IEEE Fellow. He has industrial and academic experience in various areas, such as computer architecture, hardware security, and architectures for machine learning. He graduated (Ph.D.) from the University of Massachusetts at Amherst (UMASS). He served as a senior researcher and principal engineer at Intel and was appointed as a visiting professor at Nanyang University in Singapore under the MediaTek Chair. Avi Mendelson was a member of the ACM-Europe Council (2009-2014) and the IEEE Computer Society Board of Governors (2017-2019 as a member and second VP)..

## Fedor Mesinger[1], Katarina Veljovic[2], Sin Chan Chou[3], Jorge L. Gomes[3], André A. Lyra[3], and Dusan Jovic[4]
[1] Serbian Academy of Sciences and Arts, Belgrade, SRB, [2] Faculty of Physics, University of Belgrade, Belgrade, SRB, [3] National Institute for Space Studies (INPE), Cachoeira Paulista, SP, BRA, [4] IMSG at NOAA/NCEP/EMC, Rockville, MD, USA

### Atmospheric Eta Model Features Responsible for its Skill

**Abstract:** While the history of the atmospheric "Eta model" goes back to 1973, the results demonstrating its skill compared to models using other approaches are more recent. At the early nineties at the U.S. National Meteorological Center it showed results better than competing models and became its primary regional forecasting model. Later it demonstrated performance better than its driver ECMWF ensemble members in placing tropospheric jet stream winds east of the Rockies. Recently (Gutierrez et al. JGR Atmos. 2024) it was reported to have done better than four other models over a topography challenged region. Why was that possible will be summarized in the presentation.

**Bio:** Fedor Mesinger received his Sc.D. degree from the University of Belgrade in 1960. He later spent extended periods at several leading modeling centers. The côde Mesinger wrote in Belgrade in 1973, subsequently developed by him and by Zavisa Janjic, he brought in 1984 to the then U.S. National Meteorological Center. As the "Eta model" in 1993 it became the primary U.S. operational regional weather prediction model. Mesinger is a member of the Serbian Academy of Sciences and Arts, of the Academia Europaea, and of the International Eurasian Academy of Sciences. He is the recipient of the 2001 Vilhelm Bjerknes medal of the European Geophysical Society.

# ABSTRACTS & BIOSKETCHES

## Miodrag J. Mihaljevic
Serbian Academy of Sciences and Arts, Belgrade, SRB

### Selected Issues on Synergy of Artificial Intelligence, Blockchain Technology and Cryptology

**Abstract:** Artificial intelligence (AI) and blockchain technology (BC) are among hottest topics within information technologies and provide background for many new applications. AI has the potential to add an extra layer of security by monitoring transactions and network activities, detecting and initiating mitigation measures. BC could provide an additional trustworthiness level regarding training data for machine learning (ML) as well as ML procedures in the ML distributed scenarios. On the other hand, cryptology appears as a background for techniques of BC and AI. Accordingly, this talk addresses a number of related issues that illustrate contemporary synergy of AI, BC and cryptographic techniques.

**Bio:** Miodrag J. Mihaljevic is a Research Professor and the Deputy Director with the Mathematical Institute, Serbian Academy of Sciences and Arts, Belgrade. His main research interests include cryptology, information security and blockchain technology. Since 1997, he has been holding long-term visiting positions at the universities and research institutes in Japan, including The University of Tokyo, Sony Research Labs, the National Institute AIST, and Chuo University, Tokyo. Currently he has the visiting positions at the University of Tokyo, Institute of Industrial Science, and at University of Montenegro, Centre for Multidisciplinary Research. In 2013, he received the National Award of the Serbian Academy of Sciences and Arts for ten years achievements. Since 2014, he has been an Elected Member of the Academia Europaea. In the years 2020, 2021, 2022 and 2023. Dr. Mihaljevic is included in the ranked list conoquially known as "World's Top 2% Scientists" (by Elsevier and Stanford University) regarding his career achievements. He is an Elected Member of the Serbian Academy of Sciences and Arts from 2021.

## Bojana Milosevic
University of Belgrade, Faculty of Mathematics, SRB

### Understanding Spherical and Hyperspherical Data: From Association Measurement to Variable Selection

**Abstract:** Hyperspherical or directional data naturally arise in many different earth sciences, such as geology, seismology, astrophysics, oceanography, and meteorology, as well as in studies of animal behavior, proteomics, and neuroscience. However, the special structure of such data makes it quite challenging to identify associations, primarily due to the non-trivial adaptation of statistical methodologies designed for Euclidean data. Here, we present recent results in detecting dependence using generalized energy distance statistics and extend this methodology for application to variable screening in high-dimensional data cases.

**Bio:** Bojana Milosevic is an Associate Professor, Corporate Affairs Coordinator, and Chair of Department of Probability and Statistics at the Faculty of Mathematics, University of Belgrade. Her research interests include nonparametric statistics, data science, and related topics. Since obtaining her PhD in 2016, she has published over 40 articles in prestigious journals, authored two university textbooks, and served as an associate editor for the Journal of Applied Statistics and Statistics and Probability Letters. She has presented her work at more than 70 international conferences, including 20 by invitation, and participated in several international projects, including leadership roles.

## Zorica Mladenovic
University of Belgrade, Faculty of Economics and Business, SRB

### Some Eonometric Issues in Modelling Inflation

**Abstract:** The recent surge of prices across many economies reopened the issue of econometric framework used to capture dynamic characteristics of inflation time series. The discussion is relevant for economies that exhibit high sensitivity to exogenous shocks. It is also of interest for central banks with inflation targeting monetary policy regime, given that their decision making should incorporate inflation projections. We will consider econometric approaches designed for specific features expected to be found in inflation time series. To assess the relative contribution of aggregate demand and supply side shocks in inflation dynamics, we will examine the appropriateness of some commonly used multivariate models.

**Bio:** Zorica Mladenovic graduated from the Faculty of Economics, University of Montenegro in Podgorica in 1987. She received PhD at the Faculty of Economics, University of Belgrade in 1994, where she has been working since 1989 (as full professor since 2005). She was visiting researcher at the European University Institute in Florence and visiting professor at University of Oxford and Free University in Amsterdam. Her main research area includes econometric modelling of macroeconomic time series. Her key publications are 19 papers in SSCI journals, three textbooks and two monographs. She was a member of the National Bank of Serbia Council (2008-2012).

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## Nebojsa Neskovic
World Academy of Art and Science, Napa, California, USA

### Crystal Rainbows

**Abstract:** We will consider the problem of transmission of charged particles through channels of a thin crystal. Unlike in the conventional approach, based on the methods of statistical mechanics, the mapping of the particle entrance plane to its exit plane will be analyzed with the focus put on the complexity of the process. Consequently, the rainbow effect will occur – the angular distribution of transmitted particles will abruptly change across the lines identified as the crystal rainbow lines. The resulting theory has been successfully used to explain a few experiments with ions or electrons and thin crystals, which could not be explained by the conventional theory.

**Bio:** Nebojsa Neskovic is a theoretical physicist also involved in accelerator technologies. Currently, he is a Vice President of the World Academy of Art and Science, and the President of the Serbian Chapter of the Club of Rome. He was employed in the Vinca Institute of Nuclear Sciences, Belgrade, Serbia, from 1975 to 2016. Between 1991 and 2007, he was the Head of the TESLA Project, which comprised the construction of a large-scale infrastructure for production, acceleration, and use of ion beams in science, technology, medicine, and education. He has authored or coauthored numerous articles in international scientific journals.

## Milorad M. Novicevic
School of Business Administration, University of Mississippi, USA

### Montenegrin Honor

**Abstract:** The concept of honor is historically embedded into the Montenegrin culture. This embeddedness was clearly originally captured in Marko Miljanov's 'Honor and Heroism.' Curiously, the concept of Montenegrin honor has not been scientifically examined. The purpose of this article will be to outline both the quantitative and qualitative studies for this examination. The focus of the qualitative examination will be on the historization and vocabulary of Montenegrin honor (relying on the existing Gelfand' research). Whereas, quantitative examination will focus on construct validation (relying on the existing Vasiljevic's research).

**Bio:** Milorad M. Novicevic (Ph.D. University of Oklahoma) is Former Chair of the Academy of Management Management History Davison and Associate Professor at the University of Mississippi. He has published more than 180 articles in leading management journals and co-authored a book Management and Organizational History: A Research Overview published by Routledge, a leading global publishers. He won John F. Mee Award, SAGE Award for Best Paper in Leadership, Halloran Award for Best Paper in Ethics, Richard M. Hodgetts Distinguished Career Award presented by the Academy of Management, and Outstanding Article Award in the Journal of Management History..

## Predrag Obradovic
School of Electrical Engineering, University of Belgrade, SRB

### Connect the Dots (CTD) Algorithm for Pattern Detection in Graphs

**Abstract:** Connectedness patterns in biologic graphs often represent important functional structures. Most solutions for graph pattern detection conduct costly permutation testing for p-value bounds and require knowledge about the whole graph. Connect the Dots (CTD) is an information-theoretic algorithm which identifies highly connected subsets in complex networks by using data compression and avoiding permutation testing, addressing computational challenges in metabolomics and transcriptomics. CTD has identified and validated chemotherapy response biomarkers in Triple Negative Breast Cancer (TNBC) models. Additionally, CTD/WGCNA approaches have revealed robust biomarkers across chemotherapy drugs. CTD's information-theoretic bounds also enhance detecting shared communities between weighted labeled graphs, expanding its applicability to social networks.

**Bio:** Predrag Obradovic was born in 1995 in Belgrade, Serbia. While attending Mathematical Grammar School, Predrag competed in mathematics, physics and astrophysics and represented Serbia three times on the International Olympiad in Astronomy and Astrophysics, winning a bronze medal in 2014. Predrag is an author of two books of poetry and a laureate of over a hundred national and international poetry competitions. Since finishing undergraduate and master's degree studies in Software Engineering on the University of Belgrade, School of Electrical Engineering in 2018, he has worked in the Department of Computer Science and Information Technology while pursuing a PhD in graph theory..

# ABSTRACTS & BIOSKETCHES

## Milos Ojdanic
Data Scientist at Goodyear Innovation Center, Alumni of University of Luxembourg, LTU

### Selected Issues in Software Testing

**Abstract:** Our work focuses on continuous software testing. More specifically, we proposed change-aware mutation testing. This technique utilises artificial faults (a.k.a. mutants) inside the code to test only change-relevant software behaviour given the delta between changed software versions. Our technique is 30% more effective in software fault detection than the other techniques. At the same time, it is an order of magnitude more efficient than standard variations of mutation testing. We further optimise change-aware mutation testing by using machine learning to tackle complexity and reduce the scope of fault seeding by focusing on the most context-suitable mutants. At the same time, we propose and show ways to further improve artificial faults using the power of graph neural networks.

**Bio:** Milos Ojdanic is a Staff Data Scientist and Principal Investigator at Goodyear Innovation Center in Luxembourg. His interests revolve around building intelligent systems and inference using big data. Milos completed his PhD at the University of Luxembourg in industrial collaboration with PayPal, working on the Assessing and Improving PayPal DevOps practices project. As a post-doctoral researcher at the Interdisciplinary Center for Security, Reliability and Trust, he researched software code representation and mutation testing using Graph Neural Networks.Major international journals and conferences, such as TSE, TOSEM, EMSE, and ICSE, have acknowledged his achievements and visibility.

## Petar Otasevic
Dedinje Cardiovascular Institute and Belgrade University School of Medicine, Belgrade, SRB

### Selected Issues on Cardiovascular Diseases

**Abstract:** PROBLEM STATEMENT: High LDL-cholesterol concentrations constitute a risk for atherosclerotic cardiovascular disease. The efficacy of statin treatment is dose dependent and achieves a risk reduction of up to 50%. THE BEST EXISTING SOLUTION: By consensus, cholesterol-lowering therapy is initiated with a statin that reduces endogenous cholesterol synthesis, upregulates hepatic LDL receptor activity, increases LDL clearance and lowers LDL-cholesterol concentrations in the bloodstream. THE PROPOSED SOLUTION: On this background, we suggest to "get personal" and individualize cholesterol-lowering therapies, according to the individual's status of cholesterol synthesis and absorption. ANALYSIS: Using individualized cholesterol-lowering therapies it will be possible to achieve target LDL levels in 95% patients.

**Bio:** He was born in 1969. He completed his faculty and post-graduate studies at the Faculty of Medicine, University of Belgrade. He trained at Cleveland Clinic, USA and Kerckhoff Clinic, Germany. It deals with heart failure and coronary artery disease. He is currently acting as the manager of the Cardiology Clinic, IKVB Dedinje, Belgrade. He is an associate professor at the Department of Internal Medicine, Faculty of Medicine in Belgrade. He is the author and co-author of 83 papers in-extenso in journals cited in the Science Citation Index. h-index 20.

## Petraq Papajorgji
Tirana, ALB & University of Florida, USA

### Mind Genomics

**Abstract:** Mind Genomics is a relatively young science developed primarily to measure clients'feelings regarding a particular product or service. With time it's applications grew including several fields far from the original target, marketing. Currently, there are mind genomics applications in education, political sciences, finance, psychology, etc. The heart of mind genomics approach is a four by four model containing four silos that are the pillars of the study. These pillars are presented as questions. For each question, four answers are selected to represent all points of views. The system creates vignettes that are contexts to be evaluated by study participants. Linear regression is applied to analyse the data. Mind Genomics has evolved to include AI-based capabilities.

**Bio:** Prof. Dr. Petraq Papajorgji is Emeritus Professor at the European University of Tirana, Tirana, Albania. His area of expertise is modeling complex information systems. Prof. Papajorgji was, for 10 years, editor-in-chief of the International Journal of Agricultural and Environmental Information Systems (IJAEIS), Associate Editor of the Journal of Biomedical Data Mining, Iberoamerican Journal of Applied Computing, Member of the Center for Applied Optimization University of Florida, Gainesville, Florida, USA, Honorary Citizen of Berat, Albania. Prof. Papajorgji is a member of the group awarded the Prize of the Republic for the study "On the Conditions of the Olive Tree in Albania", 1986.

# ABSTRACTS & BIOSKETCHES

## Marija Polovina
Faculty of Medicine, University of Belgrade, SRB

### *Risk assessment and prevention of sudden cardiac death in cardiomyopathies: challenges and perspectives*

**Abstract:** Cardiomyopathies are significant contributors to cardiovascular morbidity and mortality due to high burden of heart failure, cardiac arrhythmias and increased risk of sudden cardiac death (SCD). SCD occurs at a rate of 0.15-0.7% per year (depending on the cardiomyopathy), which significantly surpasses SCD incidence in the general population. Over the recent years, the knowledge on the mechanisms and risk factors for SCD has substantially improved, allowing for the better-informed risk stratification. However, unresolved issues still challenge the guidance of SCD prevention in cardiomyopathies. This lecture will discuss established and emerging concepts in risk assessment and prevention of SCD in cardiomyopathies.

**Bio:** Associate Professor, Internal Medicine and Cardiology, Faculty of Medicine, Belgrade University. Head, Cardiac Intensive Care Unit IV, Department of Cardiology, University Clinical Centre of Serbia, Belgrade Serbia. Fellow of the European Society of Cardiology, Fellow of the Heart Failure Association. Associate Editor, ESC Heart Failure Journal. Chair of the Heart Failure Association of the European Society of Cardiology Scientific Committee on Inflammatory Cardiomyopathies (2024-2026). Published 98 papers in peer reviewed journals (H-index: 27), co-author of several chapters in the ESC Textbook of Heart Failure (published in 2023) and several chapters in national cardiology and internal medicine textbooks.

## Slobodan Radoman
RADDAR, Hong Kong, HKSAR, CHN

### *CHARRETTE: The Architect's Sherlock Holmes*

**Abstract:** In an ever-growing maze of digital answers to design problems, the most pertinent question – why? – remains unanswered. Concealed by the digital tools that claim to boost the efficiency of a design process, architects are yet to address the greatest threat to design process efficiency and – most critically – its relevance. Charrette shifts the focus from a mere design production to the analysis of a project's brief, its site and its key stakeholders. With the most tangible diagnosis, Charrette is a win-win tool that enables the architects to reclaim the key player role in the building industry, while simultaneously providing the most original design solutions.

**Bio:** Slobodan (Slobo) Radoman earned an IB diploma at UWC of the Atlantic. He received his BA degree in architecture at Harvard College, then his M.Arch degree and Urban Design Certificate at the Massachusetts Institute of Technology, where he was also a Fellow at the Legatum Center for Entrepreneurship. Before founding RADDAR in Hong Kong, Slobo worked for world-renowned architectural firms: I.M. Pei (NYC), ODBC (Paris), DPA (Paris), EMBT (Barcelona) and OMA (Hong Kong, NYC, Rotterdam). He is a lecturer at the architecture programs of Hong Kong University SPACE and Chu Hai College of Higher Education. He researches on the topic of the periphery in urban planning, and on the topic of analysis of clients and project briefs.

## Petar Scepanovic
Roche, Basel, CHE

### *Molecular mimicry from the microbiome as a target for human autoimmune diseases*

**Abstract:** Antiphospholipid syndrome (APS) is an autoimmune disease caused by self targeting antiphospholipid antibodies that lead to an increased risk of thrombosis. Genetically predisposing factors are known yet alone cannot be decisive for the onset and severity of APS. Gut microbiome is thought to be implicated in the development and persistence of autoimmunity in APS through the cross-reactivity between mimotopes expressed by a common human gut commensal, Roseburia intestinalis, and T and B cell autoepitopes. We sequenced stool microbiome from APS patients and healthy donors and present the analysis aimed at the identification of the novel causes of the disease.

**Bio:** Petar Scepanovic was born in Cetinje, Montenegro. After Gymnasium „Slobodan Skerovic" in Podgorica, he enrolled at University of Turin, Italy studying Biotechnology. After obtaining his Bachelors, he continued his Master's studies in Molecular Biotechnology at the same University. He continued his education by obtaining a PhD in Human Genomics at EPFL in Lausanne, Switzerland. He then continued his research activities at the University of Cambridge, UK where he was a Research Associate in the Department of Public Health and Primary Care. He is currently a Senior Scientist at pRED (Pharma Research and Early Development) of Roche in Basel, Switzerland.

# ABSTRACTS & BIOSKETCHES

## Evgeny A. Shvarts

Institute of Geography, Russian Academy of Sciences, Honored Ecologist of Russian Federation, RUS

### Market-Oriented Voluntary Mechanisms of Environmental Responsibility and "Fragmenting" Markets

**Abstract:** In the current geopolitical context environmental factors continue to play an important role in "fragmenting" markets with environmentally sensitive end users. International retailers and packaging manufacturers play an important role in this process, with companies in these sectors relying on global voluntary environmental certification standards in their purchasing policies. In the BRICS+ countries, which focus on exporting value-added wood and agricultural products to developed countries, international voluntary environmental certification systems have been developed for a considerable time. For example, the FSC forest certification system is developed in Brazil, China, India, Indonesia and Malaysia. Market-oriented mechanisms of environmental responsibility are gradually creating "new normality" in the global economy.

**Bio:** Evgeny A. Shvarts – born 27.05.1958 year in Moscow. Graduated from Faculty of Biology, Lomonosov Moscow State University. Holds Candidate of Science (PhD) and a Habilitation degree Doctor of Sciences from Institute of Geography, Russian Academy of Sciences (IGRAS). Evgeny Shvarts is Honored Ecologist of Russian Federation. Head of Center for responsible use of natural resources, IGRAS and Professor of Faculty of Geography and Geoinformatics technologies, Research University "Higher School of Economics", Moscow. He has published more than 190 scientific articles and 14 books. Dr. Evgeny Shvarts is former Director of Conservation/ Director of Conservation Policy of WWF-Russia (1998 - 2019).

## Ervin Spahic

WindGrid, Elia Group, GER

### Transmission Grid Planning Offshore

**Abstract:** Worldwide there is strong increase of renewable generation. In2023 in Europe there was installed 34 GW of installed offshore windgeneration with prediction for more than 300 GW in 2030. Their integrationi.e. connection to the existing grids has many challenges that have to beconsidered. Their connection can be as HVAC or HVDC depending on the distanceto the connection point and on the power to be transmitted. Both, advantagesand disadvantages for each technology including planning will be shown. Severalexamples of offshore transmission projects will be presented.

**Bio:** Dr.-Ing. Ervin Spahic graduated from the Faculty of Electrical Engineering, University of Montenegro, majoring in power systems in 1997 and 2001, respectively. From 1998-2002. he worked as a research associate at UCG, Department of Power Systems. 2003-2008. Technische Universität Darmstadt, Germany, as a research scientist and defended his doctoral dissertation in 2008 on the topic "Connection of offshore wind farms via HVDC". 2008-2013. Senior consultant at ABB Germany. 2013-2022 Siemens in various positions: Group Head for Future Technologies, Chief Engineer for Converter Plants. Focus on HVDC, FACTS and storage. He has published more than 80 papers and more than 10 patents. Currently Dr. Spahic holds the position of Manager for Transmission Network Planning at WindGrid, Elia Group, focusing on future HVDC projects and offshore networks and connection of offshore wind farms. He actively participates in the projects InterOPERA, Ready4DC, and in several CIGRE and IEEE working groups.

## Alexander D. Stajkovic

University of Wisconsin-Madison, Wisconsin School of Business, USA

### Leveraging Paradoxes to Catalyze Social Change

**Abstract:** Double-Bind and the Effectiveness of Women Leaders in a Crisis The think manager, think male paradigm contends that because top roles are mostly male-occupied, and men are mostly agentic, then agency is needed for leadership. By implication, communality, which is more associated with women, is discordant with leadership. Prof. Stajkovic will present his research on this double bind women face. His research evidences a female leadership advantage in a crisis: states led by women were associated with fewer COVID-19 deaths, cities led by women were associated with greater racial inclusion and economic outcomes, Black women police chiefs were associated with least violent BLM protests, and women-led non-profits were linked to the lowest homelessness counts.

**Bio:** Alex is a Professor of Leadership and Organizational Behavior in the Management and Human Resources Department at the University of Wisconsin-Madison, School of Business. He is a member of the Faculty Advisory Committee of the Tommy G. Thompson Center on Public Leadership at the University of Wisconsin-Madison. Alex is also a Faculty Affiliate of the African Studies Program at UW-Madison. He was a visiting scholar in the psychology department at Stanford University.

# ABSTRACTS & BIOSKETCHES

## Balsa Terzic
Old Dominion University in Norfolk, Virginia, USA

### Numerical Simulation of Radiation Profiles From Inverse Compton Sources

**Abstract:** Inverse Compton Sources (ICS) present a promising novel way of producing x-rays with advantages of narrow radiation bandwidth and far smaller cost of operation as compared with synchrotron sources. Optimizing the performance of the existing and the design of the future ICS crucially depends on accurate computer simulations. Such simulations enable numerical tests of new experimental techniques, or even serve as diagnostic tools, replacing expensive hardware. Currently, such simulations are carried out by ad hoc, individually developed, disjointed pieces of software. We developed a comprehensive analytical formalism and computer codes for high-fidelity simulation of radiation from ICS. The novel approach shows excellent agreement with experimental.

**Bio:** Balsa Terzic is an Associate Professor & Graduate Program Director in the department of physics at Old Dominion University in Norfolk, Virginia, USA. He was born in Podgorica in 1974, and attended Matematicka Gimnazija in Belgrade before moving to the USA. In 1995, he received a BS in mathematics and computer science from Liberty University in Lynchburg, Virginia. He earned his PhD in mathematics from Florida State University in 2002, where he studied chaos in elliptical galaxies. Balsa's interdisciplinary research, spanning mathematics, physics and computer science, includes inverse Compton sources of x-ray radiation, high-performance computation, nonlinear dynamics in galaxies and general relativity.

## Demetrios Theophylactou
The COSMOS University, Nicosia, CYP

### Selected Issues in High-Level Education

**Abstract:** The mission of the new COSMOS university is to explore new horizons in education focusing on science, technology, and related disciplines. It covers mostly physics and related natural sciences, with a proper stress on AI and techniques that could be utilized for maximization of effectiveness in experimenting and data analysis. This is a non-profit private university, as all eventual profits are set to be reinvested into research - the handful of founders, among themselves, so far generated several hundreads of thousands citations at the Google Scholar system. The geographicvcal scope of activities encompasses the entire globe, both for professorships and for students, based on innovative approaches to distant learning.

**Bio:** Demetrios Theophylactou holds the PhD degree from the University of Washington in the USA, and was on the athletic team of his alma mater university (he is a former champion of Cyprus, Greece, and Balkans in running 400m, 800m, and 1500m). After graduation, he joined Harvard University as a post-doctoral fellow. He upgraded his academic career with a set of successful services in various diplomatic missions of Cyprus: United Nations in New York, European Union in Brussels, Australia, India with a number of neighboring countries, and Balkans. His last diplomatic post was the ambassador of Cyprus in Serbia and Montenegro. Presently he consults for businesses that synergize science and education.

## Milo Tomasevic
School of Electrical Engineering, University of Belgrade, SRB

### Thread-Level Speculation in Multicore Processors

**Abstract:** Thread-level Speculation (TLS) technique enables even possibly data-dependent threads to run in parallel as long as the semantics of the sequential execution is preserved. A special hardware support monitors the actual data dependencies between threads at run time and, if they are violated, misspeculation effects are undone. However, the TLS mechanism requires complex protocols that employ both cache coherence and speculation to maintain the correctness of program execution. This talk will survey relevant TLS issues. Special attention will be devoted to the proposal of the write-invalidate Speculation Integrated with Snoopy Coherence (SISC) protocol, its implementation details, and evaluation.

**Bio:** Milo Tomasevic was born in Niksic. He is a full professor at the School of Electrical Engineering, Belgrade where he was the Dean, 2017-21. He was visiting researcher at Purdue University, USA. For two decades he was visiting professor at the University of Montenegro, Podgorica. He published 140 scientific and obtained awards for some of them. He served as a member of the program boards for international and domestic journals and conferences. With coauthors, he delivered invited talks and tutorials abroad in companies, universities, and conferences. His main research interests are parallel systems, algorithms and data structures, cryptanalysis.

# ABSTRACTS & BIOSKETCHES

**Aleksandar Tomic**, Arvind Sharma, and Lawrence Fulton
Boston College, USA

### Evaluating and Improving the Metropolitan Economic Freedom Index

**Abstract:** The Metropolitan Economic Freedom Index (MEFI) ranks cities based on their support of free market enterprise. In its current state, MEFI purports to measure three constructs (government spending, taxation, and labor market freedom) with three equally weighted variables for each one, assuming perfect substitutability of variables. This study investigates the statistical consistency of MEFI through Confirmatory Factor Analysis. Multiple models investigate current variable selection by providing a potentially better indicator of labor market freedom, aggregation assumptions by removing the requirements for fixed and equal weights, and statistical consistency by evaluating the fit between the data and models. Results indicate that the current MEFI model is not statistically consistent with the data, that weighting of variables should not be equal, that variable selection should be investigated, and that constructs should be re-imagined. The models investigated provide an initial starting point for redefining MEFI.

**Bio:** Dr. Aleksandar (Sasha) Tomic is a distinguished academic leader and economist, currently serving as the Associate Dean for Strategy, Innovation, & Technology at Boston College's Woods College of Advancing Studies. In this role, he also holds the position of Senior Program Director for both the Master of Science in Applied Analytics and Master of Science in Applied Economics programs. Dr. Tomic's multifaceted contributions extend to the Morrissey College of Arts and Sciences and the Carroll School of Management at Boston College, where he is an Associate Professor of Practice in the Economics department and the Business Analytics Department, respectively. Before joining Boston College, he served as an Associate Professor at Mercer University and a Professor at the Jack Welch Management Institute in Herndon, Virginia. He played a pivotal role as Principal in Econometrics with HENDYPLAN, S.A. in Luxembourg. Dr. Tomic has earned a Bachelor of Science from Texas A&M University - Commerce, and a Master of Arts and a Ph.D. in Applied Economics from Clemson University.

**Dragan P. Uskokovic**[1], and **Vuk Uskokovic**[2,3]
[1] Institute of Technical Sciences of the Serbian Academy of Sciences and Arts, Belgrade, SRB, [2] TardigradeNano LLC, Irvine, USA, [3] Department of Mechanical Engineering, San Diego State University, San Diego, USA

### More than half a Century with Advanced Materials and Nanotechnologies in Montenegro

**Abstract:** From September 2 to September 6, 2024, two anniversary conferences will be held jointly in Herceg-Novi: the XIII World Round Table Conference on Sintering (https://www.iiss-sci.org/), which marks 55 years since the inaugural conference was held in 1969 in Herceg-Novi, and the 25th YUCOMAT Conference (www.mrs-serbia.org.rs) launched in 1995, also in Herceg-Novi. To date, more than 7,000 lectures have been held at both conferences, by authors from the world's most famous universities and national laboratories, including Nobel Prize laureates. Scientific and technological achievements in our countries have been outstandingly represented at both conferences for more than 50 years, spreading excellence on the international scale in the extremely important field of materials science and engineering.

**Bio:** Dragan P. Uskokovic is widely recognized as a distuingshed scientist, educator and organizer in materials science and engineering, especially in synthesis, processing and application of nanoparticles, science and technology of sintering and advanced functional materials in various fields of nanotechnology. He was born in April 3, 1944 in Cetinje. He graduated from the Faculty of Technology and Metallurgy at Belgrade University in 1967, earned master's degree in 1971 and doctoral disertation in 1974. He started his research at the Vinca Institute of Nuclear Sciences, Belgrade in 1968 and continue in Institute of Technical Sciences of the Serbian Academy of Sciences and Arts, Belgrade. He was director of the Institute from 2001 until 2011. He was a professor at the Belgrade University and at the International Postgraduated Jozef Stefan Institute School in the Program on Nanoscience and Nanotechnology. He held more than 100 invited lectures worlwide. He is President of the Materials Research Society of Serbia and International Institute for the Science of Sintering. According to Google Scholar he has 9850 citation and H=53.

# ABSTRACTS & BIOSKETCHES

## Vuk Uskokovic

TardigradeNano LLC, Irvine, USA, Department of Mechanical Engineering, San Diego State University, San Diego, USA

### On the Effort to Restore the Relevance of Hydroxyapatite in Biomedicine

**Abstract:** Hydroxyapatite was selected by Nature to act as the key component of the skeletal foundations of our bodies. This has served as an invaluable inspiration for materials scientists who have attempted to discover in this material more potential than meets the eye. I will describe a decade of personal effort to expand the application repertoire of hydroxyapatite beyond their use as traditional bone fillers or tissue engineering construct components that impart osteoconductivity and high compressive strength. These new applications of hydroxyapatite are for sustained drug delivery, gene and anticancer therapies, antibiofilm coatings and tissue regeneration. All this plethora of applications for hydroxyapatite are currently in the R&D stage and are the consequence of the immense structural complexity of this material, which is being directly reflected in its ability to display an array of exciting properties under precise synthesis regimens. Like water, la principessa of peculiarities in the realm of liquids, hydroxyapatite deserves the epithet of il principe of peculiarities in the realm of solids. Its protean nature and the applicative potentials arising from this peculiar nature will be described in this lecture. Foreseen on the horizon will be a new generation of materials for therapeutic and regenerative applications, containing only precisely designed hydroxyapatite and substituting for the role of expensive bone growth factors, antibiotics, viral vectors and polymers.

**Bio:** Vuk Uskokovic, PhD, MSc, MS, BSc, is a Serbian-Slovenian-American scientist, educator and multimedia artist, currently a lecturer in engineering at San Diego State University, a visiting professor at University of Montenegro and the Cofounder and Chief Scientific Officer at TardigradeNano LLC, a zero-profit biotech startup, think tank and educational and social advocacy powerhouse, all under one hat, located in Irvine, California. Dr. Uskokovic holds degrees in physical chemistry (BSc & MS), materials science and engineering (MSc), and nanoscience and nanotechnologies (PhD), and has completed postdoctoral trainings in colloid chemistry, fine particle synthesis, biomimetics, tissue engineering and controlled drug delivery. Prior to his current appointments, he was a professor in the schools of engineering, pharmacy and medicine at the University of California in Irvine, Chapman University and University of Illinois in Chicago, respectively, where he ran research labs and taught a variety of subjects, including biomaterials, nanophysics, medical devices, biologics, bio-optics, and other.

## Petar Velickovic

Google DeepMind / University of Cambridge, GBR

### Selected Issues in AI

**Abstract:** What makes an AI system better, or worse, at fitting certain tasks? This question is at the heart of building intelligent systems, and it is remarkably hard to answer rigorously. Over the past years, there have been a plethora of attempts, using various facets of advanced mathematics, to answer this question under various assumptions. I will present my approach to research in this area, which leverages diverse branches of mathematics and computer science, and resulted in several important downstream applications: substantially improving travel-time predictions in Google Maps, guiding intuition of mathematicians towards new theories, and the first full AI system for tactical suggestions in football.

**Bio:** Petar Velickovic is a Staff Research Scientist at Google DeepMind, Affiliated Lecturer at the University of Cambridge, and an Associate of Clare Hall, Cambridge. He holds a PhD in Computer Science from the University of Cambridge (Trinity College), obtained under the supervision of Pietro Liò. Petar's research concerns geometric deep learning---devising neural network architectures that respect the invariances and symmetries in data (a topic he's co-written a proto-book about). For his contributions, Petar is recognised as an ELLIS Scholar in the Geometric Deep Learning Program. Particularly, Petar focusses on graph representation learning and its applications in algorithmic reasoning.

# ABSTRACTS & BIOSKETCHES

## Aleksandar Videnovic
Harvard Medical School, USA

### From Aggressive Dreams to Parkinson's and Dementia

**Abstract:** REM sleep behavior disorder (RBD) is a condition where people act out their dreams while sleeping. During REM sleep, our bodies are normally paralyzed. In RBD, this paralysis doesn't occur, leading to movements like kicking, punching, or even jumping out of bed. These actions can be dangerous and often disrupt sleep. Further, individuals affected by RBD have a high risk of developing neurodegenerative disorders such as Parkinson's disease and dementia. Identifying RBD early can help in monitoring the progression of the neurodegenerative process and the development of novel treatments to prevent these disorders.

**Bio:** Aleksandar Videnovic is a Professor of Neurology at Harvard Medical School, Director of the Division of Sleep Medicine at Massachusetts General Hospital, and Director of the MGH Program on Sleep, Circadian Biology, and Neurodegeneration. His research programs are focused on the interface of sleep, circadian biology, and neurodegeneration, as well as on clinical trials in sleep and neurodegenerative disorders. Dr. Videnovic serves in numerous leadership roles with the American Academy of Neurology, the American Academy of Sleep Medicine, the International RBD Study Group, and the Parkinson Study Group. His work has been published in leading scientific journals in neurology and neuroscience.

## Malisa Vucinic
Inria, FRA

### IETF LAKE: Lightweight Authenticated Key Exchange for Internet-of-Things Use Cases

**Abstract:** Authenticated key exchange protocols play a crucial role in the communication security stack of an Internet-of-Things device: they authenticate the communicating parties and establish a shared symmetric secret between them. The recently standardized EDHOC protocol (RFC 9528 and RFC 9529) performs a compact Diffie-Hellman key exchange, requiring several times less bytes-over-the-air than the de-facto solution used on the Internet, the (D)TLS protocol. In this talk, we will give an overview of the standardization process of EDHOC within the Internet Engineering Task Force. We will discuss EDHOC requirements, building blocks, performance, and the most notable points from the formal analysis stage.

**Bio:** Malisa Vucinic is a Research Scientist with the AIO team of the Inria research institute in Paris. He received the Engineering degree from the University of Montenegro in 2010, the joint Master's degree from the Politecnico di Torino and the Grenoble Institute of Technology in 2012, and the PhD degree from the Grenoble Alps University in 2015. In parallel with his PhD studies, he was a Research Engineer with STMicroelectronics, and a Visiting Scholar with the University of California at Berkeley in 2015. Malisa is active in the Internet Engineering Task Force where he co-chairs the IETF LAKE working group.

## Marija Vujacic
Hitachi Energy, ITA

### Grid Forming BESS: A Critical Enabler for High Penetration of Inverter-Based Resources

**Abstract:** Global power systems are evolving to achieve carbon neutrality by integrating inverter-based resources (IBRs) like wind and solar, replacing fossil fuel-based generators. Network stability, power quality, service continuity and capacity remain crucial. This talk highlights the grid-forming (GFM) battery energy storage system (BESS) as vital for integrating renewables, especially in weak networks. Inverters, though different from synchronous generators, can act as voltage sources. By adding virtual synchronous machine control and energy storage, IBRs enhance system strength by providing inertia and fault current. GFM BESS stands out for its ability to deliver multiple services, allowing revenue stacking. Large-scale adoption, however, needs robust performance standards and market mechanisms.

**Bio:** Dr Marija Vujacic is the Global Product Manager for Battery Energy Storage at Hitachi Energy. She holds a Bachelor's degree from the University of Montenegro (2013), a Master's degree from the University of Belgrade (2014), and a PhD degree in Power Electronics from the University of Bologna (2019). She was a Visiting Researcher at Liverpool John Moores University in 2018 and an Adjunct Professor at the University of Bologna, teaching courses on renewable energy and green technologies in 2022 and 2023. Previously, she worked at Engie EPS as an R&D product design engineer. Her current role focuses on advancing energy storage solutions for technological and business leadership.

# ABSTRACTS & BIOSKETCHES

## Silva Vujanovic
University of Montreal, CAN

### Medicinal Cannabis and Quality Control: A "Sine Qua Non" Continuum

**Abstract:** Legalization of Cannabis is expanding across the globe, with Germany being one of the most recent countries to amend its legislature in 2024. Although Cannabis can be used recreationally, its most interesting indication remains medicinal, the therapeutic spectrum ranging from chronic pain to epilepsy management. Whichever the purpose, quality production of Cannabis products remains at the heart of product safety and efficacy. Nevertheless, development of standards for quality production seems to be lagging behind legalization. To bridge the gap of knowledge in quality production, there are several considerations, one being the acceleration of research on the Cannabis-microbiome. The current presentation is a general overview, aiming to juxtapose the importance of Cannabis medicinal applications with product quality as a *sine qua non* continuum. This presentation is of interest to academics, students, policymakers and industry.

**Bio:** Ms. Silva Vujanovic studied Health Sciences at the University of Ottawa, and graduated Pharmacy at the University of Saskatchewan. Then, she completed her residency at McGill's University Health Center, and has obtained her M.Sc. in advanced pharmacotherapy from the University of Montreal. Ms. Vujanovic is a hospital pharmacist applying scientific knowledge and clinical expertise to internal medicine, emergency medicine, and geriatrics. She has published several scientific and review papers pertaining to her domains of interest. She is a clinical preceptor for pharmacy students at both University of Montreal and Laval University. Having studied across Canada in health sciences, later specializing in pharmacy, she has worked in several healthcare systems with the aim to provide holistic patient care.

## Vladimir Vujanovic
University of Saskatchewan, CAN

### Next Generation Biologicals: Microbiome Solutions for Sustainable Agriculture, Forests and Ecosystems

**Abstract:** Plant microbial endophytes hold the key to solving some of the most pressing challenges facing modern agriculture, forestry, and ecosystems. Over the last century, by focusing on breeding, synthetic fertilizers, and pesticides, bioscience has neglected fundamental aspects of plant fitness driven by the intracellular microbial endophytes. Recent discovery of seed endophytes was instrumental for my laboratory to develop the concept of plant prenatal care, revealing vital mechanisms in plant adaptation and survival. This emerging, phytobiome-based science has further translated into discovery of next-generation biological products, offering targeted solutions for plant/tree health, as well as for productivity and sustainability of ecosystems.

**Bio:** Dr. Vladimir Vujanovic grew up in Montenegro. He graduated in Forestry at the University of Zagreb and has obtained his M.Sc. in Mycology and Ph.D. in Biotechnics at the University of Belgrade. He moved to Canada as a postdoctoral fellow at the Université du Québec à Montréal. Prior to becoming Professor and Agri-Food Innovation Fund Chair at the University of Saskatchewan, he was a researcher in Mycology and Plant Pathology at the Montreal Botanical Garden and Adjunct Professor at the University of Montreal. He concurrently coordinated a research center at McGill University. He was an invited, visiting scientist at several national and international universities. A prolific scientist, he has nearly 200 publications to his name. He is recipient of prestigious awards, recognizing his creation of innovative microbial bioproducts, as well as his patents which were licensed by global biotech companies. He is Editor of the Canadian Journal of Microbiology, in addition to sitting on the Editorial board of international journals.

# ABSTRACTS & BIOSKETCHES

## Milica Vujkovic
University of Belgrade, SRB

### Materials Empowering Future Energy Storage Systems

**Abstract:** The role of rechargeable batteries in electrochemical storage systems is of essential importance, due to their capability to store energy from renewable sources and deliver it to electric vehicles. The basic question regarding batteries is how they produce energy and what controls it. The talk will address this issue through a brief overview of electrode materials crucial for the development of both Li-ion and Na-ion energy storage systems. A special focus will be on revolutionary frameworks that make global improvements.

**Bio:** Milica Vujkovic was born in Niksic, Montenegro. She is employed at the University of Belgrade - Faculty of Physical Chemistry, where she graduated and received PhD in the area of Li-ion batteries. Her research interests are focused on energy-related applications. Milica is a visiting professor/researcher at the University of Montenegro and a lecturer within the prestigious MESC+ master program. She coordinates several projects and holds 52 scientific papers, 1 book chapter and 3 nationally approved patents. Her papers, published since 2011, have been cited more than 1319 times with h=20.

## Slobodan Vujosevic
Mathematical institute of SASA, Belgrade, SRB

### Semi-Mathematical Statements

**Abstract:** Propositions in which intuitive and formal concepts appear are semimathematical. They cannot be proven, since they are not formal, but they can be elucidated relying on proven mathematical theorems or philosophical assumptions. Except in cases where intuitive notions can be formalized or mathematically defined, such elucidations are not conclusive, but they undoubtedly contribute to our understanding of semi-mathematical statements. Relying on Goedel's main theorems and recent results in the axiomatizability of the notion of effectiveness, we will elucidate three semimathematical statements: Hilbert's thesis, Church's thesis and Goedel's disjunctive thesis.
Key words: Semi-mathematical, elucidation, thesis.

**Bio:** Born in 1950 in Belgrade. Received Orthodox baptism in Podgorica in 1983. Academic degrees, master's degree in 1978 and doctorate in 1982 at the Faculty of Mathematics in Belgrade in the field of mathematical logic and algebra. He worked as an assistant at the Faculty of Economics in Belgrade, and from 1983, in teaching positions, at the University of Montenegro until his retirement in 2017. Elected full professor in 1996. He taught mathematical analysis, logic, computability theory and philosophy of mathematics at the Faculty of Science and Mathematics in Podgorica and the Faculty of Mathematics in Belgrade. Published works (as well as two books) in the fields of logic, algebra and philosophy of mathematics. For the last ten years, he has been dealing with the philosophy of mind, i.e. Kurt Goedel's legacy in that area.

## Ilija Vukotic
University of Chicago, USA

### Selected Issues in High Energy Physics

**Abstract:** The High Energy Physics, particularly the HL-LHC experiments, has historically depended on Moore's law to manage data processing at exponentially increasing rates. However, with Moore's law no longer holding, and faced with a nearly constant computing budget alongside significantly higher demands, innovative strategies are imperative. This discussion will cover various approaches, including research and development of new algorithms, optimizing the use of current hardware (more vector operations and instructions per cycle), increasing the reliance on GPUs and other accelerators, expanding high-performance computing (HPC) usage, leveraging public cloud resources, and improving resource management through AI.

**Bio:** Ilija Vukotic (born in Niksic, 1974) studied Applied Physics at PMF in Belgrade before obtaining a PhD in High Energy Physics from Humboldt University, Berlin. There, he researched the production of charmonium states in proton-nucleus collisions in DESY's HERA-B experiment. After a two-year stint in diverse jobs in Montenegro, he completed a post-doc at the Linear Accelerator Laboratory in Paris, where he studied Higgs boson production at CERN's ATLAS experiment. For the past 12 years, he has been at the University of Chicago, working on novel ways to perform data analysis on globally distributed, exabyte-sized HEP datasets.

# ABSTRACTS & BIOSKETCHES

Ramzi Benkraiem[1], Nebojsa Dimic[2], Vanja Piljak[2], Laurens Swinkels[3,4], and **Milos Vulanovic**[5]

[1] Audencia Business School, FRA, [2] University of Vaasa, School of Accounting and Finance, FIN, [3] Erasmus University, NLD, [4] Robeco Institutional Asset Management, NLD, [5] EDHEC Business School, FRA

### Climate Risk and International Corporate Bond Market

**Abstract:** We examine the impact of the media-based climate change concerns (grouped into physical and transition risk categories) on the international corporate bond market. We analyze the following aspects: (i) market development (developed versus emerging markets); (ii) credit quality (investment grade versus high yield bonds), (iii) industry (climate-sensitive versus non-sensitive industries), and (iv) maturity (short versus long term bonds). We find that transition risk is reflected in the global corporate bond market, but not in the emerging corporate bond market segment. Furthermore, transition risk has a material impact only on the investment grade bonds in the global corporate bond market. Keywords: Climate risk, Physical risk, Transition risk, Corporate bonds, Emerging markets.

**Bio:** Milos Vulanovic, teaches Finance at EDHEC Business School. He holds a Ph.D. in Financial Economics from The Graduate Center at City University of New York. His prior teaching includes City University of Hong Kong, Western New England University, Baruch College, Yeshiva University, Pace University, Lehman College and New York Institute of Technology. His research includes empirical corporate finance, mergers and acquisitions, venture capital and specified purpose acquisition companies. His papers have been published in number of financial economics journals including Journal of Economic Behavior & Organization, European Financial Management, Energy Journal, Journal of International al Financial Markets, Institutions and Money, etc.

## Komnen Zizic

University of Novi Pazar, SRB + AUT

### The Conceptual Framework as a Method for Developing Preliminary Theories in the Planning and Design of Cities

**Abstract:** A knowledge transfer from other disciplines into urban planning and design is well known to be important in forming theories about cities. Some studies highlighted the need to determine methods how to achieve that, and just a few studies mentioned the importance of an early phase of the transfer process. This article explains a conceptual framework as a method for a synthesis of diverse sources into conceptual knowledge at an early phase of research in the planning and design. The results indicate that conceptual framework is the promising method for a developing tentative theories about things and processes in cites.

**Bio:** Komnen Zizic is an architect, who currently works in Konin - Studio for design and research. He completed his Ph.D. in Architecture and Urbanism at University of Belgrade. Komnen's research focuses on healthy cities and on research methods in planning and design. His work has been recognized for bridging theoretical gaps between planning, design and public health. Komnen's current interest is focused on developing an approach that helps to form tentative theories which can be useful for planning and designing contemporary healthy cities and places.

## ABSTRACTS & BIOSKETCHES (BIRDS OF A FEATHER)

### Nikola Altiparmakov
Faculty of Economics, University of Belgrade, SRB

#### Is it Worth Abolishing the State Pension System?

**Abstract:** Public opinion polls from America, through Europe to the Balkans show that citizens, especially young people, do not have too much trust in state pension systems and that they prefer private capitalized pension systems. Also, in the general public it is often considered that private systems are superior and safer compared to state systems of intergenerational solidarity. In this paper, we show the economic virtues and advantages of state pension systems of intergenerational solidarity and explain that they provide policyholders with rates of return equal to the growth rate of gross domestic product - something that many private pension systems fail to do. This is precisely why no developed country in Western Europe has decided to (partially or completely) abolish the state pension system. On the other hand, the results of the partial abolition of the state pension system in some Eastern European countries have turned out to be very unfavorable during the past 25 years, which leads an increasing number of insured persons and countries to return to the protection of state pension systems.

**Bio:** Dr. Nikola Altiparmakov is an assistant professor at the Faculty of Economics, University of Belgrade, at the Department of Statistics and Mathematics. He completed his doctoral studies at the Faculty of Economics in 2014, he completed his Master of Economic Studies with a specialization in macroeconomics and finance at the University of Toronto, Canada, in 2005, while he graduated in informatics, economics and statistics as one of the students of his generation at the University of Waterloo, Canada, 2003. Dr. Altiparmakov has been an active participant in macro-fiscal reforms in the Republic of Serbia since 2003. He started his career as a Debt Analyst at the Treasury of Serbia, continuing as a macro-fiscal consultant at the Tax Administration of Serbia and Advisor for Fiscal Policy at the Ministry of Finance. In 2011, he was elected as one of the three members of the newly formed Fiscal Council of the Republic of Serbia. He has published a large number of works in the field of pension reforms and tax systems in leading domestic and international journals, where he is also an invited reviewer.

### Vesna Bengin
BioSense Institute, SRB

#### Building a European Center of Scientific Excellence in Western Balkans

**Abstract:** BioSense Institute is today recognized as a European Center of Excellence (CoE) for advanced technologies in agriculture (i.e. digital agriculture), and it is up to date the only CoE established in a non-EU country (associate country). It's growth from only 13 to over 150 researchers in eight years is based on a detailed business plan developed within Horizon 2020 ANTARES project, which encompasses scientific, investment, organizational, financial and execution aspects, with a common goal of enabling scientific excellence and widely spreading its impact to the society. Firstly, the concept of the ANTARES business plan will be presented, followed by a focus on a set of internal and external obstacles that hinder the development of CoEs in the region, and on a set of measures that can be used to overcome those obstacles.

**Bio:** Prof. Vesna Bengin is the co-founder of BioSense Institute and the coordinator of the 30 million € H2020 project ANTARES, which turned BioSense into a European Centre of excellence. She is a scientific advisor at BioSense, a full professor at the Dept. of Physics, University of Novi Sad, and an Extraordinary Professor at Stellenbosch University in South Africa. Prof. Bengin also serves as a member of UNICEF Business Advisory Board in Serbia, a consultant for UN FAO, a consultant for UNDP, and a member of the Management Board of BioSense. She is the recipient of a number of national and international awards including '*Marie Curie Actions for an Innovative Europe*' and the award for outstanding women in science and technology *She's Mercedes*. She is a mother of three.

# ABSTRACTS & BIOSKETCHES (BIRDS OF A FEATHER)

## Fabio Clarizia
University of Salerno, ITA

### Including Ontology in Dialogue Systems: The Case of Advanced Dialogue System to Prevent Diseases that Cause Dementia

**Abstract:** This lecture presents an ontology-based dialogue system for preventing dementia. The system is designed to address the growing challenge of dementia caused by an aging population. The pathophysiology of dementia is multifactorial: vascular, genetic, metabolic, inflammatory, social, and personal factors contribute to disease onset.The ontology, modeled after medical questionnaires, collects user data in four key areas to represent dementia risk factors: Cognitive Reserve, Intellectual Life, Nutrition, and Vascular Risk. Including the ontology module in the dialogue system is intended to increase the efficiency and accuracy of information retrieval and make the dialogues more flexible and easily configurable.

**Bio:** Fabio Clarizia started the Computer science studies at Department of Electronic Engineering, University of Salerno, Italy (1999), where he obtained MSC in Electronic Engineering (2006) and Ph.D. in Information Engineering (2011) with the thesis on "Probabilistic Lightweight Ontology for the Extraction and Representation of Semantics". Since 2006 he has working on the research activities in the area of Knowledge Management, with attention to the implementation of techniques and methodologies for knowledge representation and management at the Department for Electronic Engeneeering of University of Salerno. He is currently a Tenure Track Researcher at the Department of Humanities of University of Salerno.

## Freddy Gabbay
Hebrew University of Jerusalem, ISR

### Emerging Semiconductors Reliability Challenges in Advanced Process Nodes– An Architectural Viewpoint

**Abstract:** Reliability is essential in integrated circuits (ICs) to ensure correct operation over their lifetime, especially in mission-critical systems. Modern process technologies have increased IC vulnerability, making reliability a growing concern. Advanced technologies impose challenging design rules, burdening the VLSI implementation flow. This talk addresses two key IC aging phenomena: electromigration and transistor aging. EM, caused by excessive current flow, damages on-die wires, leading to shorts and voids. Transistor aging, induced by Hot Carrier Injection and Bias Temperature Instability , slows down transistors and causes unequal timing degradation. An aging-aware microarchitecture is introduced to mitigate these reliability issues in modern microprocessors.

**Bio:** Freddy Gabbay received his Ph.D. in EE from the Technion. He has worked at Intel's Microprocessor Research Lab and Mellanox, where he led switch product line architecture and ASIC design. At Freescale Semiconductor, he was a senior design manager for baseband ASIC products. In 2012, he rejoined Mellanox as Vice President of Chip Design. Currently, he is an associate professor and head of the VLSI Lab in the Institute of Applied at the Hebrew University of Jerusalem. His research focuses on VLSI, chip design, computer architecture, and AI accelerators. He holds 19 patents and is a senior IEEE member.

## Miodrag Grbic
University of Western Ontario, CAN

### Natural Nano-Material Derived from Spider Mite Silk: Genomics of Agricultural Pest Leads to Novel Biomaterial

**Abstract:** Nanomaterials are one of the fastest developing industry and technology sectors. Their application ranges from medicine (drug carriers, cancer treatment), nanocapsules (for vaccine delivery), cosmetics (carriers of cosmetic products, sun creams), to industrial applications such as the textile industry, nanocatalysis and engineering of new materials. Most of the currently used nanomaterials are inorganic nanomaterials or chemically synthesized nanomaterials such as carbon nanotubes or polystyrene. However, the utilization of these synthetic nanomaterials raises significant health concerns. In this presentation, we describe the development of novel biological nano-material derived from spider mite silk using a combination of genomics, cell and molecular biology, and biotechnology.

**Bio:** Miodrag Grbic is an associate professor at the University of Western Ontario (Canada) leading the Arthropod and agricultural genomic program. He obtained his Undergraduate and masters degree from the University of Novi Sad and Ph.D. degree at the University of Wisconsin-Madison, USA. Following a postdoctoral degree at the University of Cambridge, UK, he established his laboratory in Canada. Dr. Grbic led the team that sequenced the first chelicerate genome, the genome of the two-spotted spider mite *Tetranychus urticae*, a major agricultural pest. He is also a visiting professor at the University of La Rioja, Spain, the University of Belgrade, and the University of Montenegro, Podgorica.

# ABSTRACTS & BIOSKETCHES (BIRDS OF A FEATHER)

Vladimir Zhurov[1], Ken Narva[2], **Miodrag Grbic**[1], and **Vojislava Grbic**[1]
[1] University of Western Ontario, CAN, [2] GreenLight Biosciences, USA

### RNAi in Two Spotted Spider Mite Tetranychus Urticae

**Abstract:** *Tetranychus urticae* is a cosmopolitan pest with an extremely wide range of plant hosts. Availability of its high-quality genome sequences enables studies of mechanisms that facilitate mite rapid adaptation to new plant host and development of pesticides resistance. In support of such studies, we have developed RNAi as a reverse genetics tool. Here, we will discuss the potential of using RNAi as a strategy to control *T. urticae*. The ability of dsRNA to specifically target pest species through a mode of action that is independent of those associated with currently used pesticides makes RNAi-based biopesticides an attractive alternative to chemical-based control measures and an important tool for mite pesticide resistance management.

**Bio:** Vojislava Grbic is Professor in Department of Biology, Faculty of Science, Western University. Her research focuses on the genomics of plant-herbivore interaction. In the last several years, Dr. V Grbic established *T. urticae* as a model system for molecular, genetic and genomic studies in Chelicerata and have combined it with the existing *Arabidopsis*, tomato and grapevine genomic resources to investigate induced defense responses of both organisms during their interaction. Grbic's lab is also developing tools for more efficient management of spider mite populations in agriculture that include development of diagnostics of spider mite pesticide resistance and new RNAi-based acaricides. Dr. V Grbic has experience leading large-scale research projects including the Genome Canada ($6.3M, 2009-14; $4.1M, 2023-26), Ontario Research Fund ($2M, 2011-15; $3.6M, 2015-2021) and FACCE-ERA-NET+ on Climate Smart Agriculture (EUR1.7M, 2014-2017). She obtained total career research funding in the amount of >$15M and infrastructure and equipment funding in the amount of $2M. V Grbic manages research group of ~20 people, including graduate students, technicians, postdoctoral fellows, research associate and usually international visiting scientists. She filed two internationalized patents and were awarded Western's Vanguard Award in 2015 and 2020 for the commercialization efforts.

## Aleksandar Kavcic
Carnegie Mellon University, Pittsburgh, USA

### Selected Issues on Magnetic Data Storage

**Abstract:** We will follow the trajectory of a doctoral dissertation, from the problem formulation, through the solution, patent application and a legal battle that lasted almost 20 years (and is still ongoing). The invention is the optimal reader (with the smallest probability of reading error) of data written on a magnetic disk which instantly increased the recording density by 50%. Magnetic disks are about 70 years old, but only in the late 1990s they made it into the lap-top computers which triggered a rapid expansion of the magnetic data storage industry. Exactly then, in 1998, the patent was issued, but it did not get immediate recognition even though it was being used and copied within the industry. The first lawsuit, filed in 2009, ended in only 2016 with a $750M settlement. The second lawsuit is ongoing.

**Bio:** Aleksandar Kavcic received the Dipl. Ing. degree in Electrical Engineering from Ruhr-University, Bochum, Germany in 1993, and the Ph.D. degree in Electrical and Computer Engineering from Carnegie Mellon University in 1998. Since 2017 he has been an adjunct professor of Electrical Engineering at Carnegie Mellon University in Pittsburgh, PA. In the past, he served as assistant professor, associate professor and professor at Harvard University and the University of Hawaii. He also held shot-term visiting positions at two Universities in Hong Kong. Well known for his patents for reading data from magnetic memories. Founder of the Alek Kavcic Foundation which provides free textbooks for elementary and middle school children in Serbia.

## ABSTRACTS & BIOSKETCHES (BIRDS OF A FEATHER)

**Petar M. Seferovic**[1,2], and **Marija Polovina**[1,3]

[1] Faculty of Medicine, University of Belgrade, SRB, [2] Serbian Academy of Sciences and Arts, Belgrade, SRB, [3] Department of Cardiology, Clinical Centre of Serbia, Belgrade, SRB

### *Major Advances in the Treatment of Heart Failure: Endless Game!*

**Abstract:** A major progress in the treatment of heart failure with reduced ejection fraction (HFrEF) has been achieved, with the introduction of multiple disease-modifying therapies which reduce morbidity, and mortality of those patients. This include sacubitril/valsartan, sodium-glucose contransporter-2 [SGLT2] inhibitors and vericiguat, Sacubitril/valsartan and SGLT2 inhibitors (dapagliflozin and empagliflozin) should be given to all patients with HFrEF, while vericiguat is indicated in selected patients with more severe HFrEF, requiring recent hospitalizations. Advances in the management of comorbidities associated with HFrEF patients (type 2 diabetes, iron deficiency/anemia, chronic kidney disease) are further improving outcomes. The efficacy and safety of these new medical therapies in HFrEF, will significantly improve the clinical perspective of these patients.

**Bio:** Petar M. Seferovic is Academician of Serbian Academy of Sciences and Arts (2018-), Co-Editor for Eastern Europe, European Heart Journal (2021-), Co-chairman, Quality of Care Centers, Registries, HFA Atlas Committe of the Heart Failure Society of the ESC (2022-), Vice President, European Society of Cardiology (2020-2022), President, Heart Failure Association of the European Society of Cardiology (2018-2020), Professor of Internal Medicine/Cardiology, Medical Faculty, University of Belgrade (2000 - ) and President, Heart Failure Society of Serbia (2011 - ). Prof Seferovic is the leading European cardiologist in the field of heart failure, diabetes and cardiovascular diasese, heart muscle and pericardial disease. He co-authored 657 scientific papers with cumulative impact factor of 3768,83. According to Clarivate list he was among 6900 most cited experts in 2022. This fact was instrumental to put the position of Belgrade University among the first 500 universities in the world.

## Yahel Vilan

ISR

### *Educational and Scientific Challenges of Modern Israel*

**Abstract:** Among the major national priorities of Israel are education and science. The educational system, on all leveles of higher education, includes a number of specific solutions not found in many other countries. These solutions are aimed at enabling all the talents to obtain fair chances and to be well prepared for post-graduation activitis in areas of interest for the national focuses and for the scientific research able to generate results on the top of the global achievements in theory and technology. Some case studies will be elaborated and shared with the audience, to stimulate future interests for cooperation in theory and technology.

**Bio:** Yahel Vilan was born in 1968. He is a former ambassador of Israel for Montenegro and Serbia. Before that, he served as the ambassador of Israel for Kenya, Tanzania, Uganda, Malawi, and Seyshelles. His experiences are related also to his prior diplomatic services in India, Poland, Hungary, USA, Democratic Republic Kongo, and Vietnam. All his undergraduate and graduate degrees are from the Tel Aviv University in Israel, in Political Science and Security Studies. His interests synergize political sciences, education, and scientific research. He is married and has four sons with one wife. He has climbed all the way to Manito jezero and Kapa stozacka at Mount Lukavica.

## Miljan Vuletic

Darwin Edge, Lausanne, CHE

### *Emerging AI Applications in Healthcare*

**Abstract:** Increasing healthcare costs and population aging burden economies of developed countries. The developing world, nevertheless, lacks medical staff and technical means to provide high-quality health services at a large scale. Artificial intelligence applied to healthcare and medical problems has already shown its potential in mitigating the growing expenditures and healthcare affordability. We will discuss emerging applications of AI aiming to improve prevention, diagnostics, and follow-up of different population segments. Healthcare systems can integrate these applications within their medical networks. In particular, we show how AI helps in detection of pain, remote collection of vital signs, and pre-surgical classification of patients.

**Bio:** Miljan Vuletic received the Dipl. Ing. degree in Electrical Engineering, with a major in Computer Engineering, from University of Belgrade in 1997. In 2006, he earned the Dr.sc. degree in Computer Architecture from Ecole Polytechnique Federale de Lausanne (EPFL). Over the years spent in the semiconductor industry, he has been designing high-speed digital circuits for wireless communications. His broad industrial expertise spreads from digital design to embedded software, algorithms, signal processing, and AI. Presently, he serves as a technical director of Darwin Edge, an embedded AI company from the EPFL Innovation Park, where he leads research and development of embedded AI solutions.

# CONTRIBUTORS OF SPECIAL MERIT

## Ivan Bozovic
BNL & Yale, USA

**Bio:** Ivan Bozovic is Distinguished Scientist and MBE Group Leader at Brookhaven National Laboratory and Adjunct Professor at Yale University. He is Member of European Academy of Sciences, Foreign Member of Serbian Academy of Science and Arts, Fellow of APS, Fellow of SPIE, Professor honoris causa of University of Montenegro, and Moore Foundation Principal Investigator. He received McGroddy Prize, Bernd Matthias Prize, SPIE Science Award, Max Planck and Van Der Waals Lectureships, etc. Ivan's research interests include unconventional superconductivity, film synthesis and characterization, and nano-scale physics. He published well over 300 research papers, including over 30 in Science and Nature journals.

## Jerome Friedman
Massachusetts Institute of Technology, USA

**Bio:** Jerome Friedman is a distinguished physicist, renowned for his pioneering investigations concerning deep inelastic scattering of electrons on protons and bound neutrons, which have been of essential importance for the development of the quark model in particle physics. He received the Nobel Prize in Physics in 1990, together with Henry Kendall and Richard Taylor. His discovery has revolutionized our understanding of the atomic nucleus and the fundamental structure of matter. Friedman's work has opened new possibilities in the field of particle physics. He remains active in the scientific community, driving progress in modern physics and greatly expanding its practical applications.

## Tim Hunt
University of Cambridge, GBR

**Bio:** Tim Hunt is a distinguished biochemist, renowned for his research on cell cycle regulation. He received the Nobel Prize in Physiology or Medicine in 2001, along with Leland H. Hartwell and Paul M. Nurse, for their discoveries of key regulators of the cell. Hunt's work on cyclins, proteins that control the progression of cells through the cell cycle, has significantly advanced our understanding of cellular processes. This discovery has improved the fields of cell biology and cancer research, opening new possibilities for therapeutic interventions. Hunt is still making a significant contribution to science by pushing the limits of contemporary biology and elevating its status.

## Jean-Marie Lehn
University of Strasbourg, FRA

**Bio:** Jean-Marie Lehn is a prominent chemist celebrated for his pioneering contributions to supramolecular chemistry. In 1987, he was honored with the Nobel Prize in Chemistry, alongside Donald J. Cram and Charles J. Pedersen, for their innovative work in creating molecules that exhibit highly selective and specific interactions. Lehn's research has been fundamental in developing complex chemical systems that replicate biological functions. This breakthrough has revolutionized the discipline of chemistry, leading to new advancements in materials science, medicine, and nanotechnology. As a professor at the University of Strasbourg, Lehn continues to push the frontiers of chemistry, broadening its practical applications and potential.

## Konstantin Novoselov
University of Manchester, GBR

**Bio:** Konstantin Novoselov is a distinguished physicist, renowned for his pioneering research on graphene. He received the Nobel Prize in Physics in 2010, together with Andre Geim, for their groundbreaking experiments on graphene, a two-dimensional material with remarkable properties such as high electrical conductivity, mechanical strength, and transparency. This discovery has significant influence in the fields of nanotechnology and materials science, opening new possibilities in electronics, photonics, and beyond. Novoselov continues to explore advanced two-dimensional materials and their applications as a professor at the National University of Singapore, pushing the boundaries of modern material science and significantly expanding its potential applications.

# CONTRIBUTORS OF SPECIAL MERIT

## Dan Shechtman
Technion, Haifa, ISR

**Bio:** Dan Shechtman is a prominent chemist who received the Nobel Prize in Chemistry in 2011, for the discovery of quasicrystals, a type of solid material with a highly ordered structure that was previously thought to be impossible. However, further investigation revealed that the pattern was due to a new type of crystal structure, which did not fit the conventional rules of crystallography. This discovery led to a new field of research in materials science, as it opened up new possibilities for the design and synthesis of materials with novel properties. His work remains an important foundation for understanding the structure and properties of materials.

## Kurt Wüthrich
ETH Zurich, CHE

**Bio:** Kurt Wüthrich is a distinguished chemist/biophysicist, known for developing nuclear magnetic resonance methods for studying biological macromolecules. He was awarded the Nobel Prize in Chemistry in 2002 for the development of nuclear magnetic resonance spectroscopy for determining the three-dimensional structure of macromolecules. Wüthrich's work has a profound impact on the field of structural biology, enabling the determination of the structures of thousands of biological molecules. His research has also led to significant advances in protein folding, and enzyme catalysis. He has opened up new avenues for understanding biological processes and has paved the way for the development of new diagnostic and therapeutic strategies for diseases.

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