



Scientific Symposium  
Days of Diaspora and (Scientific) Partners (of Montenegro)

Naučni simpozijum  
Dani Dijaspore i (Akademskih) Prijatelja (Crne Gore)



Podgorica  
October 18-19 Oktobar 2023



# ABSTRACTS & BIOSKETCHES



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**Ilija Antović** Faculty of Organizational Sciences, UBG, SRB

### ***Advances in Software Engineering: User Interface***

**Abstract:** The design and implementation of user interfaces are two of the most effort and time consuming activities of the software development process. The lecture will address the automation of the process of designing and implementing user interfaces. The automation is based on the identified connections between software requirements, particularly use cases, and the resulting user interface of the application, taking into account the characteristics of the targeted implementation technologies and application types. We will also discuss the principles and characteristics which should be an integral part of the tool for automation of user interfaces development, that are all implemented in SilabUI approach.

**Bio:** Ilija Antović was born in Kotor, Montenegro, where he completed elementary and high school. He obtained BSc, MSc, and PhD degrees from the Belgrade University, Faculty of the Organizational Sciences, Belgrade (UB-FOS). He was the head of the Software Engineering Laboratory and active member of the Council at UB-FOS. He was author and coauthor of many papers published in scientific journals and international conferences. Today he works as associate professor at UB-FOS Software Engineering Department. His main research interests are the automation of software development process, software architectures, technologies and methods, as well as the development of eGovernment.

**Dušica Babović-Vuksanović** Mayo, 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 has been mostly symptomatic due to lack of effective therapies. Recent advances have led to approved medical treatments for patients with plexiform neurofibromas, and the progress has been made on development of treatments for other NF1-related complications.

**Bio:** Dušica Babović-Vuksanović 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. 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 professorships.

**Vesna Bengin** BioSense, UNS, SRB

### ***Advanced Sensing for the Agriculture of the Future***

**Abstract:** To optimize agricultural production, a plethora of sensors is needed to accurately measure various parameters related to the plant and its environment. However, no single approach can enable the development of all sensors needed. In this paper, we present an advanced approach to sensing, based on the acoustic artificial materials. We start from the idea of electro-magnetic metamaterials, expand it to the acoustic domain, and finally present a novel GRIN medium which supports the propagation of surface acoustic waves that can be externally manipulated to enable highly accurate temperature mapping, as well as gas sensing.

**Bio:** Prof. Bengin is the co-founder of the BioSense Institute and the coordinator of a €30-million H2020 project ANTARES, evolving BioSense into European Centre of scientific excellence. She is a scientific advisor at BioSense, a full professor at the University of Novi Sad and an *Extraordinary Professor* at Stellenbosch University in South Africa. Among other duties, Prof. Bengin serves as a member of UNICEF Business Advisory Board in Serbia, a consultant for UN FAO, and a consultant for UNDP. She is the recipient of the special award granted by the European Commission *Marie Curie Actions for an Innovative Europe: Excellence, mobility and skills for researchers*, the award *She's Mercedes* for outstanding women in science and technology awarded by the Mercedes-Benz company, and many more.



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**Nikola Bešić** IGN, Nansy, FRA

### ***Remote Sensing: An Experience of Atmospheric and Forest Observations in the Context of the Changing Climate***

**Abstract:** Remote Sensing is the science of acquiring information about the Earth's surface without being in contact with it, by sensing and recording scattered or emitted electromagnetic energy and processing, analysing and applying that information. This talk aims at presenting a typical remote sensing challenge of reconciling electromagnetism, data sciences and Earth's sciences, illustrated through an experience of using remote sensing for atmospheric and forest observations. The intervention as well seeks to emphasize the importance of meticulous Earth observations in the context of the changing climate and the indispensable role of remote sensing in the climate change adaptation and mitigation strategies.

**Bio:** Nikola Bešić received a BSc degree in electrical engineering from the UoM (2009) and an MSc degree in optics and RF engineering from Grenoble INP (2011). In 2014, after staying with the GIPSA-lab (Grenoble), he obtained a PhD in remote sensing from L'université Grenoble-Alpes, and simultaneously a PhD from the UoM. He was a postdoctoral researcher at the Environmental Remote Sensing Laboratory (EPFL, Lausanne), staying as well with the Radar, Satellites and Nowcasting group (MeteoSwiss, Locarno). He was also a researcher at the Centre for Radar Meteorology (Météo-France, Toulouse), and at AgroParisTech (Nancy), before joining the French National Mapping Agency (IGN).

**Ivan Božović** BNL & Yale, USA

### ***Reporting from the Frontiers of Superconductivity Research***

**Abstract:** The discovery of high-temperature superconductivity in copper oxides in the late eighties was a turning point in the history of Condensed Matter Physics. It spurred momentous advances in theory and experimental techniques and brought in new applications. However, understanding of this phenomenon is still lacking and remains one of the most important open problems in physics. More recently, some metal hydrides were found to superconduct up to room temperature, although only under enormous pressure of several million atmospheres. If we can find a way to achieve the same at ambient pressure, that may change the way Earth looks from space.

**Bio:** Ivan Božović 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.

**Ilir Çapuni** Barleti University, ALB

### ***A Mechanistic Model for Cancer: Exploring the Automata Rules that Cause Uncontrolled Cell Proliferation***

**Abstract:** A mechanistic approach to cancer involves studying and understanding cancer at a cellular and molecular level, focusing on the mechanisms and processes involved in its development, progression, and response to treatment. In this talk, we will present an asynchronous parallel model of computation that accurately models core features of the structure and functioning of living cells. Instead of considering specific genes, proteins, and molecules involved in cancer, our focus will be on fundamental cellular interactions and a basic regulatory mechanism that ensures the longevity of tissue structure, specifically repair-healing mechanisms. We will observe how certain self-organizing healing rules or strategies, under specific conditions, can cause programmatically guided but uncontrolled proliferation of cells.

**Bio:** Ilir Çapuni obtained his PhD in computer science from Boston University in 2012. He is one of the founders and a Steering Committee member of the Balkan Communications conference. His research interests include reliable computation and algorithm aspects of computer networks. He constructed a Turing machine that can compute reliably even in the presence of noise with moderate slowdown and increase in space. He also devised a method to synchronize computer clocks by analyzing time information embedded in HLS video packets. He is a technical scuba instructor and a father of three kids.



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**Mensur Dlakić** Montana State University, USA

### *How to Maintain Life in Boiling Acid*

**Abstract:** Microorganisms from hot springs of Yellowstone National Park represent some of the earliest life forms on Earth. For many of these organisms the placement in the Tree of Life is not yet established. We have sequenced several microbial communities that prefer high temperature (thermophiles). By analyzing organisms that do not require sunlight, we begin to understand how some of the first life forms may have used energy from chemical compounds such as sulfide, hydrogen and methane. Our approach integrates experiments and bioinformatic analyses to develop comprehensive and transformative understanding of the evolutionary history and metabolic capabilities of deeply rooted thermophiles.

**Bio:** Mensur Dlakić 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.

**Dražen Drašković** School of Electrical Engineering, UBG, SRB

### *AI – Apocalypse or Revolution*

**Abstract:** Since the fifties of the last century, when the mathematician A. Turing posed an experiment, and question Can machines think?, Artificial Intelligence (AI) has been developing some years faster and some intervals slower. Today we mainly talk about three types of AI: narrow, strong and super. In this lecture, the most important AI products in the last 20 years will be highlighted: human-computer games, intelligent virtual assistants, and large language models that are actively used in the field of natural language processing, then image generation, recognition, processing, and AI application in the field of autonomous driving and robotics. Will the fate of these AI products be determined by our actions, leading to either a new world revolution or an apocalypse?

**Bio:** Dr Dražen Drašković is an Assistant Professor at the University of Belgrade, School of Electrical Engineering (UB-ETF). He received a BSc degree in Software Engineering, an MSc degree, and a Ph.D. degree in Electrical and Computer Engineering from the UB-ETF. His current research interests include the application of AI algorithms, machine learning, natural language processing, and big data analysis. He published more than 80 scientific papers. He is a member of international professional organisations IEEE and ACM. He worked as a professional associate, software architect, engineer and consultant, for UNOPS, UNDP, WHO, and other institutions. He was involved in more than 10 international R&D projects (FP7, Horizon2020, Erasmus+, WUS, COST).

**Vladan Đokić** Rector, UBG, SRB

### *Advances in Urbanism: Praxis of Urban Morphology*

**Abstract:** In its jubilee year of 215 years, the University of Belgrade and the Faculty of Architecture as its constituent member have an opportunity to host the 30th International Seminar on Urban Form Conference (ISUF2023) titled Praxis of Urban Morphology. The ISUF 2023 aims to build on the previous experience and ideas, and to direct activities toward systematization and synthesis of intellectual heritage at an international level, aiming to embody these ideas into operational knowledge. Accordingly, the presentation would cover the main issues raised by scholars and practitioners both in Serbian Architectural Journal special issue and during conferences with the overall goal to contribute to the advancement of knowledge in this field, moreover, to reconsider and critically examine advancements and perspectives on urban morphology.

**Bio:** Vladan Djokić studied at the University of Belgrade, Faculty of Architecture, finished his master's at the University of Southern California, School of Architecture in Los Angeles, and PhD at the University of Belgrade, Faculty of Architecture. Editor-In-Chief of the international scientific journal of architecture and urbanism – Serbian Architectural Journal since 2009. President of the Serbian Network of Urban Morphology, since 2017. Rector of the University of Belgrade from 2021. In the teaching activity, he lectures a number of courses at AFUB which relate to the field of urban planning and design, and urban morphology. In scientific and research activity he works in the field related to urban planning and design and urban morphology.



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Courtney Jungers & **Sergej Đuranović** WUSTL, St. Louis, USA

### ***New Therapies for Haploinsufficiency-related Genetic Diseases***

**Abstract:** Genetic haploinsufficiency, in which partial or complete loss of one normal allele, is the basis of numerous human diseases. In such disorders, increasing protein levels by intervening therapeutically might potentially slow or cure the disease. Current strategies use deliverables of protein, mRNA transcripts or adenoviruses with gene replacement strategy to increase reduced amounts of haploinsufficient genes. However these strategies cause immune responses, reduced efficiency during long periods of treatment and can not be used for all organs and tissues. Here we discuss new antisense oligonucleotides therapies for the gene specific increase in protein synthesis to ameliorate consequences of genetic haploinsufficiencies.

**Bio:** Dr. Sergej Djuranovic is a Professor of Cell Biology and Physiology at Washington University School of Medicine in St. Louis, USA. He earned his MSc in Biochemistry at University of Belgrade, Serbia and his PhD degree at Max-Planck Institute for Developmental Biology in Tubingen, Germany. His postdoctoral training was at Howard Hughes Medical Institute and Johns Hopkins University School of Medicine, Baltimore USA. His group studies mechanisms of gene expression regulation at the level of mRNA and protein synthesis. He is an author on numerous scientific papers, member of science associations as well as boards for pharmaceutical companies, science and diversity groups.

**Ivana Đuričić** Faculty of Pharmacy, UBG, SRB

### ***Nutraceuticals and Dietary Supplements in Health Promotion***

**Abstract:** Nutraceuticals are foods or part of foods that can provide medical or health benefits. Dietary supplements are defined as concentrated sources of bioactive compounds (e.g., vitamins, minerals, amino acids, essential fatty acids, fibres, probiotics, plants and plant extracts, etc.) in dose forms such as tablets, pills, capsules, and liquids in measured doses. Supplements are intended to support specific physiological functions but not to prevent or treat diseases in humans. Harmonized legislation regulates these products establishing rules to protect consumers against potential health risks and updating the list of substances that are known or suspected to have adverse effects on health.

**Bio:** Dr sc. Ivana Djuricic is an associate professor at the Department of bromatology within Faculty of Pharmacy, University of Belgrade. Since joining the University of Belgrade, Ivana has been involved in studies related to nutrition science and engaged in interdisciplinary research throughout national projects. As of 2017 she has participated in international COST and ERASMUS projects. Under the authorization of the Ministry of Health, Ivana works on the categorization and certification of dietary products for Serbian market. Ivana Djuricic is a member of Pharmaceutical Associations of Serbia, Serbian Nutrition Society and Association for Personalized-Holistic Approach in the Treatment of Patients.

**Siniša Đurović** University of Manchester, GBR

### ***Advances in Power Engineering***

**Abstract:** The talk will look at some of the key technical challenges to the electrification of automotive and other transportation in the electro-mechanical power conversion area. The aspects and trends related to electrical machine, power electronic and energy storage device functionality and performance required for delivering the desired electrical transportation systems' ability will be reviewed. Forecasts and future directions for automotive powertrain systems development will also be overviewed and the technical barriers to commercialising this technology discussed.

**Bio:** Dr Siniša Djurović is a Reader in the Department of Electrical and Electronic Engineering at University of Manchester, UK. His research interests are in condition monitoring, operation and modelling of electric machines and drives in renewables, automotive and industrial applications. He has been an investigator on a number of flagship UK research council projects, most recently leading the Monitoring theme across 5 universities in the EPSRC HOME Offshore consortium. He also works on industrially engaged research, e.g., condition monitoring of electric drives (Airbus, UK), sensing techniques for rotating machinery (QPS Photonics, Canada), FBG monitoring systems application (Dyson, UK) and others.





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**Nenad Filipović** Rector, UKG & Harvard University, Boston, USA

### ***Digital Patients, Myth or Reality?***

**Abstract:** Digital patients are a new paradigm for development of a new drug and medical device and test them in computer generated patients. SILICOFCM project is multiscale modeling of heart disease which considers a comprehensive list of patient specific features as genetic, biological, pharmacologic, clinical, imaging and cellular aspects. Computational platform for multiscale modelling and AI in biomedical engineering is results of SGABU project that is served as an educational tool for students and researchers. Digital patients concept will connect basic experimental research with clinical study and big data with bioinformatics, data mining and image processing tools in order to reduce animal experiments and clinical studies on real patients. **Acknowledgement:** This study is supported by the projects that have received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 952603 (SGABU project). This paper reflects only the author's view. The Commission is not responsible for any use that may be made of the information it contains.

**Bio:** Nenad D. Filipovic is Rector of University of Kragujevac, Serbia, full Professor at Faculty of Engineering and Head of Center for Bioengineering at University of Kragujevac, Serbia. He was Research Associate at Harvard School of Public Health in Boston, US. His research interests are in the area of computational mechanics, biomedical engineering, cardiovascular disease, fluid-structure interaction, biomechanics, bioinformatics, biomedical image processing, machine learning, medical informatics, multi-scale modeling, software engineering, big data, parallel computing, computational chemistry and bioprocess modeling. He also leads a number of national and international projects in EU and US in area of bioengineering, artificial intelligence and software development.

**Antonija Krstajić** Faculty of Medicine, University of Osijek, CRO

### ***Biomarkers for Acute Traumatic Brain Injury***

**Abstract:** Traumatic Brain Injury (TBI) is the the very important cause of death and disability in children and adults from ages 1 to 44. TBI is defined as an brain injury that temporarily or permanently impairs brain function, and is most often result of a blow to the head. The leading causes of TBI are falls, motor vehicle crashes, sports injuries, and assaults, respectively. Sometimes it is not easy to make a diagnosis, especially in people with a mild brain injury, because the symptoms are often non-specific. Neurological examination and various imaging techniques such as computed tomography and magnetic resonance are used in the diagnosis of TBI. Recently, it has been proposed to use different biochemical markers whose concentration changes may indicate brain injury in the early stage of the disease. The advantage of determining these markers in relation to imaging techniques lies in this that people do not have to be exposed to radiation, which is especially important in pediatric population.

**Bio:** I was born in 1974 in Kotor. Since 2002. I have been working at the Traumatology Clinic, KBC "Sisters of Mercy" in Zagreb. Since 2008. I have been working as a specialist neurologist in the Laboratory for electromyoneurographic diagnostics and treatment of the Traumatology Clinic, KBC "Sisters of Mercy". Since 2018. I have been working as a subspecialist in neuromuscular diseases. I was recognized with the title of primarius in April 2018 by the Ministry of Health. Since 2020. I have been working as the head of the Department of Neurology, Clinic for Traumatology, KBC "Sisters of Mercy". 2022. I was elected to the scientific-teaching title of associate, at the Department of neurology and psychiatry, Faculty of Dental Medicine and Health Osijek, University of J.J. Strossmayer in Osijek. As an author and co-author, I have published about fifty scientific and professional publications.



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**Goran Krstačić & Antonija Krstačić** Institute for Cardiovascular Prevention and Rehabilitation, Zagreb & University of Osijek, CRO

### ***New Screening Program for Cardiovascular Risk in Asymptomatic People***

**Abstract:** Traumatic Brain Injury (TBI) is the the very important cause of death and disability in children and adults from ages 1 to 44. TBI is defined as an brain injury that temporarily or permanently impairs brain function, and is most often result of a blow to the head. The leading causes of TBI are falls, motor vehicle crashes, sports injuries, and assaults, respectively. Sometimes it is not easy to make a diagnosis, especially in people with a mild brain injury, because the symptoms are often non-specific. Neurological examination and various imaging techniques such us computed tomography and magnetic resonance are used in the diagnosis of TBI. Recently, it has been proposed to use different biochemical markers whose concentration changes may indicate brain injury in the early stage of the disease. The advantage of determining these markers in relation to imaging techniques lies in this that people do not have to be exposed to radiation, which is especially important in pediatric population.

**Bio:** He is a Director of the Institute for Cardiovascular Prevention and Rehabilitation in Zagreb, Croatia, last 10 years. He is a full professor of internal medicine and cardiology at the Faculty for Dental Medicine and Health and School of Medicine J. J. Strossmayer University in Osijek. He is senior scientific advisor in a permanent position at the Faculty of Medicine in Zagreb, and college professor at the University of Applied Health Studies. He graduated from business school for a health manager in Zagreb and Vienna. He is associate member of the International Academy of Sciences and Arts in Bosnia and Herzegovina. He served as a chair of the Working group on e-Cardiology ESC and Coordinator of e-Technology, and the board member of EHRA and the board member of Word Association "Computing in Cardiology". He is author more than 150 publications. He is the editor-in-chief of the University textbooks "Neurocardiology", and "Cardioneurology". His area of professional interest and publications is in the field of non-invasive cardiology, digital health, cardioneurology, and cardiovascular rehabilitation.

**Elma Kurtagić** Johnson & Johnson Innovative Medicines, Boston, USA

### ***Unraveling Disease Complexity and Novel Target Discovery in Systemic Sclerosis (SSc)***

**Abstract:** SSc is a devastating autoimmune disease with chronic progressive course, with high patient heterogeneity for which no disease modifying therapies exist. It is characterized by inflammation, vascular dysfunction, and fibrosis. Our target discovery approach is focused on studying human patient samples using multiomic approach to bridge the gap in understanding disease pathogenesis that is insufficiently represented in preclinical models. Novel computational approach of well-associated proteins (WAPs) was developed that lead to the discovery of new targets. Moreover, the integration of matched patient skin and blood data revealed that patient serum protein profile might serve as a reflection of disease severity at the end-organ level.

**Bio:** Elma joined Janssen in October 2020 as Associate Scientific Director within the Immunology Discovery. She is leading a team focused on discovering novel targets to treat autoimmune diseases. Prior to Janssen, Elma worked in positions of increasing responsibility at Momenta Pharmaceuticals for 9 years, where she worked on preclinical and clinical assets in oncology and rare autoimmune diseases. Prior to Momenta, Elma conducted postdoctoral research in Biological Engineering department at MIT, studying bivalent EGF receptor ligands and their application in turning-off cancer growth signals. Elma received a bachelor's in Cell Biology from Jacobs University in Germany (2004) and Ph.D. in Cell and Molecular Biology from Boston University School of Medicine (BUSM) in 2010.

**Vladan Kuzmanović** Dean, Faculty of Civil Engineering, UBG, SRB

### ***Power Plants and Diversification of Energy Sources***

**Abstract:** The intensive progress of energy sector began at the end of the 19th century, when the first power plants were built, but the turning point was the Kyoto agreement, which changed even the philosophy of energy producing. Today, all countries face immense challenges in the energy sector. The need to reduce carbon footprint, but to meet the energy demand, requires new technological solutions and the modernization of the energy sector. The appropriate market mechanisms need to be introduced to accommodate diversification of energy sources. This complex and costly transition will have to take place in time when the available public and private capital is limited.

**Bio:** Vladan Kuzmanović was born in 1966. He is full professor at the Faculty of Civil Engineering, University of Belgrade. Prof. Kuzmanović deals with design and analysis of hydraulic structures. He published four books, more than sixty scientific and professional papers and three national level patents. He participated in more than three hundred projects and technical reviews of more than eighty structures. Prof. Kuzmanović is the vice president of Serbian Chamber of Engineers Management board, member of the Association of Structural Engineers of Serbia and International Commission on Large Dams. Since 2018, he has been the Dean of the Faculty of Civil Engineering.



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**Slobodan B. Marković** UNS, SRB

### *Paleoclimate and Humans*

**Abstract:** Nowadays, interaction between paleoclimate and paleoenvironmental changes and human cultures dynamics covers a wide scientific field at the frontier between the geosciences and archaeology. Despite the already published records of the specific evolution of the Pleistocene environment during the last two decades, the integration of these results within the field of archaeology in our part of Europe is scarce. Here we present recent advances in paleoclimatic and archeological research in our region with focus on parts of the record of the Pleistocene and Holocene age, corresponding to the presence of ancient ancestors, with the aim of better understanding their adaptation to sudden and drastic climate changes.

**Bio:** Slobodan B. Marković was born in Zrenjanin, 1970, Serbia. He obtained BSc, MSc, and PhD degrees from the University of Novi Sad, Faculty of Sciences, Belgrade (UNS-PMF). Since 2009 he is a full professor at UNS-PMF. He was a fellow of Humboldt foundation and fellow of the Award of the President of the Chinese Academy of Sciences. According to Google Scholar base he is the most cited researcher of University of Novi Sad. For 2020 and 2021 he is listed in Stanford list of top 2 % world scientists. In 2023 received the Milutin Milanković award for contribution to research development in Autonomous Province Vojvodina.

**Miodrag Mateljević** SANU, SRB

### *Hyperbolic, Euclidean, Minkowski Geometry and Theory of Special Relativity*

**Abstract:** We give a brief overview of the geometries mentioned in the title. In particular we outline short proof of The Pythagorean (or Pythagoras') Theorem based on the statement which are equivalent to The Parallel Postulate and as an application we derive Lorentz transformation.

**Bio:** Dean at Faculty of Mathematics, University of Belgrade, 2007-2014. Corresponding member of Serbian Academy of Sciences & Arts from 2012-2018. Academician of Serbian Academy of Sciences & Arts from 2018 (Nov 8). Winter semester 1988 as associate professor at University of Pittsburgh. Associate Professorship during 1988/89. at Wayne State University, Detroit. The winner of the City of Belgrade Science Award for 2006. He published about 130 scientific papers in well internationally known journals, which are quoted about 2082 times, and notable books Topics in Conformal, Quasiconformal and Harmonic maps 2012 and Kompleksne funkcije 1 & 2, 2006.

**Fedor Mesinger** SANU, SRB

### *Cut-cell Eta Model in Weather and Climate: Challenges Overcome*

**Abstract:** Incentive for writing a weather prediction model stemmed from the author's being exposed to the approach of Akio Arakawa at UCLA. The code Mesinger wrote in Belgrade in 1973, following enhancements by him and the collaborator he acquired, Zaviša Janjić, when installed in 1984 at the U.S. National Meteorological Center, attracted attention. As the "Eta model" it was implemented in 1993 as the U.S. regional weather forecasting model. Now it is extensively used also as a regional climate model over the South American domain, and in near-real time for the North American Regional Reanalysis of the U.S. Climate Prediction Center. Challenges it faced are recalled and results shown of its skill compared to that of the highly acclaimed European Centre for Medium-Range Weather Forecasts model.

**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 code Mesinger wrote in Belgrade in 1973, subsequently developed by him and by Zaviša Janjić, 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.





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**Miodrag J. Mihaljević** SANU, SRB

### ***Artificial Intelligence, ChatGPT and Blockchain Issues***

**Abstract:** Artificial intelligence (AI) and blockchain technology (BC) are among hottest topic within information technologies and provide background for many new applications. Also, these two topics appear as mutually supportive. ChatGPT is AI generated chatting robot that is an integration of multiple technologies such as unsupervised learning, instruction fine-tuning, multi-task learning, in-context learning and reinforcement learning. This talk yields certain illustrations of BC employment for developing trustful AI based big data applications and inparticular an application regarding the training data for ChatGPT that supports reliability/validity of its answers.

**Bio:** Miodrag J. Mihaljević 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. 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 and 2022. Dr. Mihaljević is included in the ranked list colloquially 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.

**Veljko Milutinović** Indiana University, USA

### ***DataFlow SuperComputing for BigData DeepAnalytics***

**Abstract:** This presentation, possibly followed by an on-line mini-course or a full-blown course on DataFlow Programming, analyses the essence of DataFlow SuperComputing, defines its advantages and sheds light on the related programming model that corresponds to the recent Intel patent about the possible future Intel's dataflow processor. The stress is on issues of interest for General Science and Engineering. Presented are the results of the scientific research and industrial developments of the author in the period of 1995 to 2020, with the following potentials: Speedup 10x to 1000x, Power 10x to 100x, Size 10x, and Precision 1x to 10x (variable in the algorithmic level, as needed by applications).

**Bio:** Professor Veljko Milutinović is an Adjunct Professor, University of Indiana in Bloomington, Indiana, USA and a Former Professor, Purdue University, West Lafayette, Indiana, USA, co-responsible for the DARPA's first GaAs microprocessor and DARPA's first GaAs Systolic Array (4096 CPUs). He is an Adjunct Professor for Life, TU Graz, Austria, a former Professor and a current Visiting Professor, University of Belgrade, Serbia. He is a Life Fellow of the IEEE, Washington, D.C., USA, a Member and a Former Trustee and Treasurer, Academia Europaea, London, GBR, a Founding Member, Serbian National Academy of Engineering, Belgrade, SRB; a Foreign Member, Montenegrin National Academy of Sciences and Arts, MNE (GSC=5800,i10=120,h=40,i100=12).

**Branislav Mitrović** SANU, CANU & Faculty of Architecture, UBG, SRB

### ***Advances in the Protection of Traditional Architectural Heritage***

**Abstract:** Presenting selected projects located in the coastal and mountainous area of Montenegro, the author interprets the methods, techniques and effects of fitting the modern form into the spatial conditions of the historical architectural heritage. Current solutions are based on the possibilities of transposing the original architectural themes which, varying from the analysis of the meaning of sinkholes and borders to the metamorphosis of the shape of walls and terraced plateaus, define the morphological context of new architectural buildings. In addition to the responsibility according to the programmatic requirements of the new content, the presented role of the designer is aimed at preserving the inherited spatial values. The study aims to show how the articulation of these values, which gives new forms a deeper meaning and shows their true potential, can become an individual task and a challenge for an architectural investment in space that represents much more than a consistent response to utilitarian aspects.

**Bio:** Graduated on Faculty of Architecture in Belgrade (1974). Employed in the design institute WO Srbijaprojekt (1977-1986), and then in CIP (1986-1990). In addition to his exceptional creative work, he makes his contribution through engagement in teaching at the Faculty of Architecture in Belgrade (1990-2014). He founded the design bureau MITarch studio (since 2006). In the same year, he became a member of SASA (corresponding in 2006, regular in 2012) and a regular member of AESS. He has completed over 200 architectural competitions and won more than 100 awards. Professor Mitrović is the author of about 40 completed buildings. He is the recipient of 40 professional and social awards. He was elected the first professor emeritus of the Faculty of Architecture in Belgrade (2015).



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## ABSTRACTS & BIOSKETCHES

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

### ***Why is it Important to Use Quantitative Methods in Social Studies***

**Abstract:** Social sciences have been historically approached using qualitative approaches. Advances in technology, especially the approach “technology as a service”, create a favorable environment for using more easily quantitative methods in social sciences. They facilitate objectivity and replicability for the study, the ability to generalize findings to a larger population, and identify patterns, relationships, and trends within the data. It provides evidence-based insights that inform policy decisions and social interventions. These models can help forecast future trends, behaviors, or outcomes, aiding decision-making processes. Quantitative research involves developing predictive models based on historical data and helps forecast future trends or outcomes.

**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.

**Dužanka Savić-Pavićević** Faculty of Biology, UBG, SRB

### ***Repeat Expansion Disorders in the Genomic Era***

**Abstract:** Short tandem repeat expansions in the human genome cause >50 rare neurological diseases. After the initial success in the 1990s, when the genetic basis of clinically well-known diseases such as myotonic dystrophy, Huntington’s disease, and Fragile X syndrome was finally solved, the main barrier in studying long, repeated DNA sequences was a technological limitation. The development of novel long-read sequencing technologies, including nanopore sequencing, is rapidly transforming the analysis of repeat expansions and has a huge potential to speed up gene discovery and clinical diagnosis. Besides, long-read sequencing is expected to improve understanding of pronounced individual variability among patients which is crucial for the design of clinical trials testing novel therapeutics for these incurable diseases.

**Bio:** Dužanka Savić-Pavićević is a Professor of Molecular Biology. She was born in Kotor and completed elementary and high school in Bar. She earned BSc, MSc and PhD degrees from the University of Belgrade-Faculty of Biology. She is a principal investigator with expertise in human molecular genetics and its application in biomedical research (>80 papers, G5 citation >1500, h index 22). She is an expert witness for forensic genetics and the Head of the Center for Human Molecular Genetics supervising rare disease genetic testing, paternity testing and newborn screening for spinal muscular atrophy. She serves as the President of the Serbian Society for Molecular Biology.

**Petar Seferović** SANU, SRB

### ***Advances in Cardiology***

**Abstract:** This presentation sheds light on the ongoing research in the domain of cardiology with the stress on the emerging approaches of the world’s leading institutions. Both prevention and treatment are covered through a description of the state-of-the-art procedures. The presentation concludes with a summary of the most important trends in the field.

**Bio:** Petar M. Seferović, MD, PhD, FESC, FACC; Co-Editor for Eastern Europe, European Heart Journal; Vice-president, European Society of Cardiology (2020-2022); President, Heart Failure Association of the ESC (2018-2020); Academician, Serbian Academy of Sciences and Arts; Professor of Cardiology, University of Belgrade Faculty of Medicine and Heart Failure Center, Belgrade University Medical Center; President, Heart Failure Society of Serbia.



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## ABSTRACTS & BIOSKETCHES

**Bratislav E. Stipančić** Project Biro Utiber, SRB / HUN

### **Modern Cable-Stayed Bridges**

**Abstract:** Modern cable-stayed bridges, with multi-stayed cables, are constructed for spans 200-1200m as 2-spans, 3-spans and multi-spans structures; having one, two or several pylons. Also they are applicable for modest spans having limited bridge deck depths and for footway/cycle bridges. The wide variety of cable-stayed bridges has been built all over the world; having steel, concrete or composite deck and steel or concrete pylons. Modern cable-stayed bridges have the effective architecture appearances, because of layout combinations related to: configuration of cable stays (harp, modified harp, fan or star) in single or double "planes" (with back-stays or without); type of steel or concrete pylon (single, double, portal, A-shaped, H-shaped, Y-inverted, M-shaped) – vertical, inclined or spaced; and type of steel, concrete or composite deck (box beam with/without struts, 2 or multi beams). Paper author's designs of cable-stayed bridges are analyzed as well.

**Bio:** Born in 1949 in Kotor. He got BSCE, MSCE & PhD degree on Belgrade University – Faculty of Civil Engineering – where he was employed until 2014 giving lectures on Metal Structures and Bridges; afterwards professor on State University in Novi Pazar until 2018. From 2019 he has been employed in Project Biro Utiber Novi Sad. His scientific research has been dedicated to the analysis of bridge structures (133 published papers). His professional work has been related to design of bridges (Solidarity Bridge in Plock across Vistula River spanning 375m & other bridges) and supervision of construction works (Ada Bridge in Belgrade, Bridge at Ostružnica, Bridge at Sremska Rača – all across Sava River). He is chairman of IABSE National Group Serbia.

**Petar Šćepanović** Roche, Basel, CHE

### **Interplay Between Human Genetics and the Microbiome in Patients in Clinical Trials**

**Abstract:** For most diseases, individual risk is influenced by genetic and non-genetic factors (including diet, socio-economic status, etc.). Microbiome, a collection of bacteria, viruses and fungi, within a human host has an important function in a variety of biological processes. Predominantly shaped by the environment, microbiome has been linked to a plethora of diseases, including cancer, metabolic syndromes and neurological disorders, as well as, response to certain drugs. By jointly investigating genetic and microbiome effects we aim to shed light on their cause / effect relationship on diseases etiology and response to treatment in patients in clinical trials.

**Bio:** Petar Šćepanović was born in Cetinje, Montenegro. After Gymnasium "Slobodan Škerović" 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.

**Ranko Šćepanović** V.P. Intel, USA

### **Advances in Microprocessor Technologies and Applications**

SEE THE INTERVIEW AT THE WEB PORTAL OF UOM, TO APPEAR SOON.

**Bio:** Dr Ranko Šćepanović is a Vice President of Intel Corporation, Santa Clara, California, USA. Prior to that he was a Vice president of LSI Logic, x, California, USA. He spent some time at Stanford University as a postdoc. His PhD is in Mathematics, from Moscow, Russia. His basic degree, also in Mathematics, is from Belgrade, Serbia. He was an award-winning High school student of The Mathematics Gymnasium in Belgrade, Serbia. He was born in Kolašin, Montenegro. He completed his Elementary school education in Kolašin and Podgorica.



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## ABSTRACTS & BIOSKETCHES

**Petar Tadić** Yale, USA

### ***Bootstrapping Quantum Field Theories***

**Abstract:** Quantum field theories are the fundamental framework for contemporary high-energy physics. Their solutions can be bounded or sometimes obtained exactly by utilizing consistency conditions and symmetry of a particular theory. We discuss this bootstrapping procedure in quantum field theories with conformal symmetry. These theories are ubiquitous in modern physics; for instance, they describe the second-order phase transitions in condensed matter systems and provide a valuable tool to gain insight into black hole physics and quantum gravity through holographic duality. We review some of the current results of conformal bootstrap and discuss the various options for future work on this topic.

**Bio:** Petar got his bachelor's degree from the University of Belgrade, Faculty of Physics. He obtained his master's degree at the University of Oxford, UK, and his Ph.D. at Trinity College Dublin, Ireland. He is a postdoctoral associate in the Physics department at Yale University, USA. He is elected assistant professor in the Scientific Computing Laboratory at the Institute of Physics, Belgrade. He was awarded the best young scientist award by the Montenegrin Ministry of Science in 2012. He works in theoretical high-energy physics. He is the author of nine papers, which have garnered 352 citations (according to Google Scholar).

**Demetrios Theophylactou** Harvard University, USA & Cosmos Open University, CYP

### ***Sinergizing Technology and Social Studies***

**Abstract:** Science and technology, on one hand, and social studies and diplomatic activity, on the other, help each other advance. Scientific knowledge is used to create new technologies. New technologies allow scientists to explore nature in different ways and make new discoveries. Economic and social development of a country rely on advanced science and technology, skilled, educated workforce as well as constant synergies between scientific and social institutions. Economic diplomacy plays an active role to this end, particularly in so far as promoting scientific and educational collaboration with other advanced states, and directly engaging diaspora in the social, economic and scientific activities of a country.

**Bio:** Demetrios A. Theophylactou was trained in University of Oxford, Harvard University and Washington State University, and possesses B.A. and M.A. degrees in Communication, and a Ph.D. in Political Science. He worked for both Cyprus and international media until 1990, including the Cyprus Broadcasting Corporation and CNN. He joined the Diplomatic Service at the Permanent Mission of Cyprus to the United Nations in NY, in 1994, and then served at the High Commission of Cyprus to Australia. He moved on to the Permanent Representation of Cyprus to the European Union in Brussels and then was appointed as High Commissioner of Cyprus in India, with parallel accreditations in eight SE Asian countries. Between his posts, he served at the headquarters of the Ministry of Foreign Affairs, including as Head of Department for Development Cooperation, Humanitarian Aid and International Economic Organisations. From 2020 until 2023, he served as Ambassador to Serbia with parallel accreditations to Montenegro and North Macedonia.

**Milo Tomašević** School of Electrical Engineering, UBG, SRB

### ***Time-Memory Trade-off in Computer Applications***

**Abstract:** Time of execution and memory space are among the most important resources in both software and hardware applications, so a primary goal is to minimize their consumption. Unfortunately, most often it is hard to achieve since these requirements are opposed. Consequently, finding an optimal balance is a key concern in the design and implementation of such applications. This talk will bring various illustrations of this problem. Special attention will be devoted to the application of time-memory trade-off in two recent related research approaches: 'perfect' chain-based cryptanalytical process and performance improvement of the OSK protocol used in the RFID device identification.

**Bio:** Milo Tomašević was born in Nikšić, Montenegro, where he completed elementary and high school. He obtained BSc, MSc, and PhD degrees from the School of Electrical Engineering, Belgrade (UB SEE). First, he was with Mihajlo Pupin Institute, Belgrade, and then with the UB SEE, where he is a full professor. In the period 2017-21. he was the Dean of the UB SEE. He was visiting researcher at Purdue University, USA. Among other universities, for two decades he was visiting professor at the University of Montenegro, Podgorica. He published 130 scientific papers and obtained awards for some of them. His work is cited 1200 times (GS, H-index 16). He participated in more than thirty projects that resulted in innovative software/hardware realizations. He was a reviewer and 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. He is a co-author of two books published by IEEE Computer Society Press. His main research interests are computer architecture and organization, parallel systems, algorithms and data structures, cryptanalysis.





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## ABSTRACTS & BIOSKETCHES

**Vuk Uskoković** SDSU, San Diego, USA

### *Selected Research from the Past Decade and Development Opportunities*

**Abstract:** In this series of presentations, I will elaborate on some of the personal R&D accomplishments from the last decade. The primary emphasis will be on biomaterials for various applications in medical engineering and pharmaceuticals. Research findings with the potential for product development and commercialization through technology transfer will be highlighted. Factors governing the transfer of technologies to developing countries, including Montenegro, will be discussed. The vision for the scientific and technological progress of Montenegro will be shared with the audience and brought up for the debate.

**Bio:** Vuk Uskoković is the co-founder and chief scientific officer at the biotech startup, TardigradeNano, and a lecturer in engineering at San Diego State University. Formerly a professor at University of Illinois in Chicago, Chapman University and University of California in Irvine, and a principal investigator at University of California in San Francisco, Dr. Uskoković is a world-renowned expert in solid state chemistry, biomaterials, medical devices, and nanotechnologies. Dr. Uskoković is the recipient of the prestigious Pathway to Independence Award from the National Institutes of Health and an author of over 200 research papers, reviews and essays from various fields of natural science and humanities.

**Milica Vujković** Faculty of Physical Chemistry, UBG, SRB

### *Looking at the Future Through the Prism of Battery Systems*

**Abstract:** We are witnessing a low-carbon energy transition, where electrochemical power sources, including batteries, supercapacitors, and fuel cells, lie at the heart of a more sustainable energy supply. If we look at the future through battery lenses and periodic table, the long-term perspective of Li-ion technology is not so promising, despite its high energy. Lithium is a limited resource so more sustainable, alternative solutions must be found, first in low- and then in high-energy applications. In that regard, several energy storage systems, based on plentiful elements, have been developing rapidly. The talk will cover the most promising ones.

**Bio:** Milica Vujković was born in Nikšić, 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 received many awards and held various lectures, including courses within the prestigious MESC+ master program. She organized COIN2022 Belgrade symposium held in SASA. She coordinates several projects including the ongoing NATOSPS project and holds 48 scientific papers, 1 book chapter and 3 nationally approved patents. Her papers, published since 2011, have been cited more than 1100 times with h=20.