ÓBUDAI EGYETEM
ÓBUDA UNIVERSITY

RECENT ADVANCES IN

INTELLIGENT ENGINEERING

ÓBUDA UNIVERSITY, BUDAPEST
SEPTEMBER 6 | 2022

Óbuda University Budapest, Hungary
with the participation of eminent scholars from the following universities:

> *Institute for Biomedical Research and Innovation, Palermo, Italy*
> *Centre for Artificial Intelligence Research and Optimisation, Torrens University, Australia*
> *Faculty of Engineering & Information Technology, University of Technology, Sydney, Australia*
> *Erasmus University Rotterdam, Netherlands*
> *Faculty of Aeronautics, Technical University of Košice, Slovakia*
> *Babeş-Bolyai University, Romania*
> *Sapientia Hungarian University of Transylvania, Romania*

Recent Advances in Intelligent Engineering

Óbuda University, Budapest
9:00 am September 6, 2022

Auditorium Maximum, Óbuda University
Bécsi út 96/b, 1034 Budapest, Hungary

The Rector Magnificus of Óbuda University announces that

Prof. Dr. Andrea De Gaetano DHC Distinguished Professor
Prof. Dr. Seyedali Mirjalili Distinguished Professor
Prof. Dr. Amirhossein Gandomi Distinguished Professor
Prof. Dr. Alexandru Kristály DSc Consolidator Researcher
Prof. Dr. László Szilágyi Consolidator Researcher
Prof. Dr. Rudolf Andoga Honorary Professor
Prof. Dr. Job van Exel Honorary Professor
Prof. Dr. Antonio Visioli, Honorary Professor
Prof. Dr. Yo-Ping Huang, Honorary Professor

appointed as Distinguished Professors,
Consolidator Researchers and Honorary Professors
of Óbuda University, Budapest, accept this position with the delivery
of an inaugural lecture on September 6, 2022,
in the Auditorium Maximum, Óbuda University

Interested parties are invited to attend this ceremony.

Prof. Dr. Levente Kovács
Rector Magnificus

Recent Advances in Intelligent Engineering

Date and Time: 9:00 am September 6, 2022 (Tuesday)

Venue: Óbuda University, Auditorium Maximum
Address: Bécsi út 96/b, H-1034 Budapest, Hungary

INTRODUCTION

Óbuda University announced its first Excellence Program in 2022, with three categories: Distinguished Professor, Consolidator Researcher and Starting Excellence Researcher.

A committee of distinguished scholars from Óbuda University selected the best applicants. The winning candidates are working between 2022-2026 at Óbuda University in the University Research and Innovation Center.

During the symposium, excellence winners and honorary professors will give inaugural presentations. During the symposium, the speakers will present their successful research and their plans for the future, with a special focus on the research planned with colleagues from Óbuda University during 2022-2026.

PROGRAM

9:00-12:20 Morning Session

Conference Chairpersons:
Prof. Dr. Levente Kovács, Rector
Prof. Dr. Imre J. Rudas DSc, Rector Emeritus, University Research and Innovation Center

Moderator:
Prof. Dr. László Gulácsi DSc, Vice Rector for Research

9:00-9:30 Opening Ceremony

Prof. Dr. Levente Kovács, Rector
Dr. Tamás Haidegger PhD, Director of University Research and Innovation Center

9:30-10:00 Mathematical Models for Continuous Glucose Monitoring: Deterministic and Stochastic Approaches

Prof. Dr. Andrea De Gaetano DHC, Director, Institute for Biomedical Research and Innovation, National Research Council of Italy - Palermo, Italy, Distinguished Professor of Óbuda University, Budapest

Abstract: In the quest for progressively more realistic mathematical representations of biomedical processes, fractional differential equations have the potential of summarizing, with an order that can in principle be estimated from data, different (presumably integer-order) interacting controls or influences upon the observed variable of interest. This is the case, for example, of transcutaneously measured glycemia, where besides glycemia itself (possibly decaying by first-order elimination) also unobserved factors (insulinemia, other hormones) may exert higher order effects. The problem is complicated by the fact that random events (hormonal oscillations and emotions, besides food intake or exercise) may affect glycemia as well, leading to the eventual formalization of the problem as a Fractional Stochastic Differential Equation. We discuss the rationale and the techniques for progressing from ODE's to more complex deterministic and stochastic models. We use a simple FSDE model of glycemic control to exemplify a possible approach to model parameter estimation in this context: advances both in model structure and in parameter estimation techniques are the topic of future research at Óbuda University. Once satisfactory modeling and estimation methods are obtained, their incorporation in devices or add-on apps for the analysis of Continuous Glucose Measurement tracings would greatly improve patient-specific tailoring of therapy, with better glycemia prediction and reduction of the frequency of occurrence of dangerous hypoglycemic episodes in the fragile, often juvenile Type 1 Diabetes Mellitus population.

Sakulrang, S., Moore, E. J., Sungnul, S., de Gaetano,

A., 2017. A fractional differential equation model for continuous glucose monitoring data. Adv Differ Equ 2017, 150. https://doi.org/10.1186/s13662-017-1207-1

De Gaetano, A., Sakulrang, S., Borri, A., Pitocco, D., Sungnul, S., Moore, E. J., 2021. Modeling continuous glucose monitoring with fractional differential equations subject to shocks. Journal of Theoretical Biology 526, 110776. https://doi.org/10.1016/j.jtbi.2021.110776

10:00-10:30 *Emerging Optimization Problems and Modern Optimization Algorithms*

Prof. Dr. Seyedali Mirjalili, Director, Centre for Artificial Intelligence Research and Optimisation, Torrens University Australia, Distinguished Professor of Óbuda University, Budapest

Abstract: The ever-increasing complexity and difficulty of optimization problems that humankind faces have substantially increased the demand for efficient and accurate optimization algorithms. Over the last two decades, nature-inspired stochastic optimization techniques have been widely used to solve a variety of problems in both science and industry. They have indeed become reliable alternatives to conventional optimization algorithms. Despite the popularity and substantial impact of such methods, optimization of real-world problems involves addressing a large number of difficulties, including but not limited to locally optimal solutions, multiple objectives, constraints, expensive objective functions, noisy data, dynamic search spaces, and uncertainties. In this talk, such difficulties are first presented along with their impact on the whole optimization process. The idea of agile and iterative optimization workflows between optimization experts and decision makers is then discussed to ensure effective use of optimization algorithms and minimize the risk of failure. Challenges and recent advances in the design and development of exact, heuristic, meta-heuristic, and hyper-heuristic optimization algorithms are then covered. There will be also information on the reason why most recent optimization algorithms tend to be nature-inspired, the future of research in this interesting area, and the substantial impact on societies.

Mirjalili, S., Song Dong, J., Lewis, A. (Eds.), 2020. Nature-Inspired Optimizers: Theories, Literature Reviews and Applications, Studies in Computational Intelligence. Springer International Publishing, Cham. https://doi.org/10.1007/978-3-030-12127-3

Mirjalili, S., Mirjalili, S. M., Lewis, A., 2014. Grey Wolf Optimizer. Advances in Engineering Software 69, 46–61. https://doi.org/10.1016/j.advengsoft.2013.12.007

Mirjalili, S., Lewis, A., Dong, J. S., 2018. Confidence-based robust optimisation using multi-objective meta-heuristics. Swarm and Evolutionary Computation 43, 109–126. https://doi.org/10.1016/j.swevo.2018.04.002

Mirjalili, S., 2019. Evolutionary Algorithms and Neural Networks, Studies in Computational Intelligence. Springer International Publishing, Cham. https://doi.org/10.1007/978-3-319-93025-1

Mirjalili, S., 2016. SCA: A Sine Cosine Algorithm for solving optimization problems. Knowledge-Based Systems 96, 120–133. https://doi.org/10.1016/j.knosys.2015.12.022

10:30-11:00 *Evolutionary Intelligence for Automated Computing*

Prof. Dr. Amir H Gandomi, Professor of Data

Science and an ARC DECRA Fellow at the Faculty of Engineering & Information Technology, University of Technology Sydney, Distinguished Professor of Óbuda University, Budapest

Abstract: Evolutionary Intelligence (EI) has been widely used during the last two decades and has remained a highly-researched topic, especially for complex real-world problems. The EI techniques are a subset of artificial intelligence, but they are slightly different from the classical methods in the sense that the intelligence of EI comes from biological systems or nature in general. The efficiency of EC is due to their significant ability to imitate the best features of nature which have evolved by natural selection over millions of years. The central theme of this presentation is about EI techniques and their application to complex real-world engineering problems. On this basis, first I will talk about an automated learning approach called genetic programming. Applied evolutionary learning will be presented, and then their new advances will be mentioned. Here, some of my studies on big data analytics and modelling using EI and genetic programming, in particular, will be presented. Second, evolutionary optimization will be presented including key applications in the design optimization of complex and nonlinear engineering systems. It will also be explained how such algorithms have been adopted to engineering problems and how their advantages over the classical optimization problems are used in action. Optimization results of large-scale towers and many-objective problems will be presented which show the applicability of EI. Finally, heuristics will be explained which are adaptable with EI and they can significantly improve the optimization results.

Gandomi, A. H., Roke, D. A., 2022. A Multiobjective Evolutionary Framework for Formulation of Nonlinear Structural Systems. IEEE Trans. Ind. Inf. 18, 5795–5803. https://doi.org/10.1109/TII.2021.3126702

Gandomi, A. H., Alavi, A. H., 2011. Multi-stage genetic programming: A new strategy to nonlinear system modeling. Information Sciences 181, 5227–5239. https://doi.org/10.1016/j.ins.2011.07.026

Telikani, A., Tahmassebi, A., Banzhaf, W., Gandomi, A. H., 2022. Evolutionary Machine Learning: A Survey. ACM Comput. Surv. 54, 1–35. https://doi.org/10.1145/3467477

Gandomi, A. H., Deb, K., 2020. Implicit constraints handling for efficient search of feasible solutions. Computer Methods in Applied Mechanics and Engineering 363, 112917. https://doi.org/10.1016/j.cma.2020.112917

Cheng, R., Omidvar, M. N., Gandomi, A. H., Sendhoff, B., Menzel, S., Yao, X., 2019. Solving Incremental Optimization Problems via Cooperative Coevolution. IEEE Trans. Evol. Computat. 23, 762–775. https://doi.org/10.1109/TEVC.2018.2883599

11:00 – 11:20 Break

11:20-11:50 The effect of curvature in geometric and functional inequalities: an optimal mass transport approach.

Prof. Dr. Alexandru Kristály DSC Department of Economics, Babes-Bolyai University, Cluj-Napoca, Romania & Institute of Applied Mathematics, Óbuda University, Budapest, Hungary, Consolidator Researcher of Óbuda University, Budapest

In this talk I will focus on isoperimetric problems, which can be formulated in terms of geometric and functional inequalities. These problems arise from geometry and mathematical physics, having applications in various domains of mathematics

and engineering. In its simplest formulation, the isoperimetric problem is to determine a domain of the largest possible volume whose boundary has a specified area.

First, I will discuss historical motivations (Dido's isoperimetric problem, Lord Rayleigh's conjecture), presenting also the landmark results of the literature.

In the second part of my talk, using the optimal mass transport theory, I prove a sharp isoperimetric inequality in metric measure spaces that are curved in the sense of Lott-Sturm-Villani. As an application of the isoperimetric inequality, I establish Sobolev and Rayleigh-Faber-Krahn inequalities with explicit sharp constants in Riemannian manifolds with nonnegative Ricci curvature. Finally, I present two recent results, where I solved the analogue of Lord Rayleigh's conjecture concerning the fundamental tone of clamped plates, both in negatively and positively curved spaces. All these arguments deeply depend on the fine structure of the ambient space (curvature bounds, dimension, size of the isoperimetric domains, etc).

Balogh, Z.M., Kristály, A., 2022. Sharp isoperimetric and Sobolev inequalities in spaces with nonnegative Ricci curvature. Mathematische Annalen. https://doi.org/10.1007/s00208-022-02380-1

Balogh, Z.M., Kristály, A., Sipos, K., 2018. Geometric inequalities on Heisenberg groups. Calculus of Variations and Partial Differential Equations. 57, 61. https://doi.org/10.1007/s00526-018-1320-3

Kristály, A., 2020. Fundamental tones of clamped plates in nonpositively curved spaces. Advances in Mathematics 367, 107113. https://doi.org/10.1016/j.aim.2020.107113

Kristály, A., 2022. Lord Rayleigh's Conjecture for Vibrating Clamped Plates in Positively Curved Spaces. Geom. Funct. Anal. https://doi.org/10.1007/s00039-022-00606-7

Kristály, A., Zhao, W., 2022. On the geometry of irreversible metric-measure spaces: Convergence, stability and analytic aspects. Journal de Mathématiques Pures et Appliquées 158, 216–292. https://doi.org/10.1016/j.matpur.2021.11.006

11:50 – 12:20 Robust fuzzy clustering models with applications in medical imaging

Prof. Dr. László Szilágyi Department of Electrical Engineering, Sapientia Hungarian University of Transylvania, Consolidator Researcher of Óbuda University, Budapest

Our world produces a quickly increasing amount of medical information, the most part of which representing imaging data. Automated decision making becomes indispensable because training more and more human experts is prohibitively costly. For this purpose, there is a need for fully automated reliable decision support algorithms that can be deployed in the processing of medical data to provide diagnosis suggestions to the medical staff. This lecture presents some own solutions to the given problem. The fuzzy-possibilistic product partition (FPPP) and the associated c-means clustering algorithm combines the probabilistic and possibilistic partitions in a way that is qualitatively different from other mixed c-means clustering models. The c-means algorithm that deploys FPPP eliminates the main disadvantages of the two partitional components, at the cost of slight sensibility to initialization. It can be used to detect clusters of special geometrical shapes

as well. The suppressed fuzzy c-means (s-FCM) algorithm was initially intended to speed up the convergence of the original fuzzy c-means (FCM), but through the generalization rules introduced after analyzing the competition in s-FCM, more accurate clustering methods were obtained. These c-means clustering models were successfully applied to provide segmentation of magnetic resonance image data accurately and efficiently. Further machine learning based solutions given to the brain tumor segmentation problem will be discussed.

Szilágyi, L., Lefkovits, S., Szilágyi, S.M., 2019. Self-Tuning Possibilistic c -Means Clustering Models. Int. J. Unc. Fuzz. Knowl. Based Syst. 27, 143–159. https://doi.org/10.1142/S0218488519400075

Szilágyi, L., 2013. Robust Spherical Shell Clustering Using Fuzzy-Possibilistic Product Partition: ROBUST SPHERICAL SHELL CLUSTERING. Int. J. Intell. Syst. 28, 524–539. https://doi.org/10.1002/int.21591

Szilágyi, L., Szilágyi, S.M., 2014. Generalization rules for the suppressed fuzzy c-means clustering algorithm. Neurocomputing 139, 298–309. https://doi.org/10.1016/j.neucom.2014.02.027

Szilágyi, L., 2014. Lessons to learn from a mistaken optimization. Pattern Recognition Letters 36, 29–35. https://doi.org/10.1016/j.patrec.2013.08.027

Szilágyi, L., Szilágyi, S.M., Benyó, B., 2012. Efficient inhomogeneity compensation using fuzzy c-means clustering models. Computer Methods and Programs in Biomedicine 108, 80–89. https://doi.org/10.1016/j.cmpb.2012.01.005

12:20-14:00 Lunch

14:00-15:00 Afternoon session

Chairpersons:
Prof. Dr. László Gulácsi DSc, Vice Rector for Research
Dr. Tamás Haidegger PhD, Director, University Research and Innovation Center

Moderator
Prof. Dr. Márta Péntek DSc, University Research and Innovation Center

14:00-14:30 Intelligent Aero Engines – Modeling, Control and Diagnostics

Prof. Dr. Rudolf Andoga, head of the Department of Avionics, Faculty of Aeronautics, Technical University of Košice, Honorary Professor of Óbuda University, Budapest

Abstract: Efficient ecologic and safe aircraft propulsion is one of the major challenges in today's aviation. Improvements in digital control systems of turbojet engines by application and development of methodologies from the area of computational cybernetics is one way to move forward and overcome these challenges. The presentation will deal with methodologies of situational control and development of an integrated intelligent control and diagnostics systems, which are suitable for efficient control of turbojet engines. The developed algorithms are validated on a small turbojet engine iSTC-21v in laboratory conditions leading towards digital intelligent aero engine able to operate in a broad spectrum of conditions including critical ones as well as alternative fuels. The developed integrated situational control system also represents a framework for control of complex cybernetic systems during all operational states including atypical ones and can be applied in other areas of modern aviation systems.

Andoga, R., Főző, L., Judičák, J., Bréda, R., Szabo, S., Rozenberg, R., Džunda, M., 2018. Intelligent Situational Control of Small Turbojet Engines. International Journal of Aerospace Engineering 2018, 1–16. https://doi.org/10.1155/2018/8328792

Andoga, R., Főző, L., Schrötter, M., Češkovič, M., Szabo, S., Bréda, R., Schreiner, M., 2019b. Intelligent Thermal Imaging-Based Diagnostics of Turbojet Engines. Applied Sciences 9, 2253. https://doi.org/10.3390/app9112253

Andoga, R., Főző, L., Schrötter, M., Szabo, S., 2021. The Use of Ethanol as an Alternative Fuel for Small Turbojet Engines. Sustainability 13, 2541. https://doi.org/10.3390/su13052541

Andoga, R., Főző, L., Kovács, R., Beneda, K., Moravec, T., Schreiner, M., 2019a. Robust Control of Small Turbojet Engines. Machines 7, 3. https://doi.org/10.3390/machines7010003

Fault Detection and Isolation of an Aircraft Turbojet Engine Using a Multi-Sensor Network and Multiple Model Approach, 2014. Acta Polytechnica Hungarica 15, 2. https://doi.org/10.12700/APH.15.1.2018.2.10

14:30-15:00 Healthcare innovations with impact: why engineers and health economists should collaborate more closely.

Prof. Dr. Job van Exel, Professor of Economics at Erasmus School of Health Policy & Management of Erasmus University Rotterdam; head of the Department of Health Economics and co-director of the Erasmus Choice Modelling Centre; Honorary Professor of Óbuda University, Budapest

Abstract: Healthcare innovations with impact: why engineers and health economists should collaborate more closely

Over the past century, innovations in medical technology have had an important impact on the life expectancy and quality of life of people around the world. However, at the same time, the introduction of all these new possibilities for treatment has increased expectations and demands for care of patients, and the adoption of all these technologies has contributed to a substantial rise in health care expenditures. Societies increasingly face the challenge of providing the health care that citizens require within the limits of available budgets. In a way, innovations in medical technology have been a blessing in disguise.

To secure and promote access for patients to future innovations, it is important that new technologies improve the efficiency of health care. This can be achieved by introducing technologies that provide the same benefits to patients at lower costs, or additional benefits at the same costs. Also, aligning innovations with patient preferences can improve adoption and adherence to treatment, ensuring the full benefits of technologies are realized.
Health economists can provide insight in the costs and benefits of new technologies, and the preferences of patients for treatment. In addition, they investigate the value of health to society, which is relevant because it helps policy makers in deciding which technologies to approve for funding from their budgets.

Innovations in medical technology can provide great benefits to patients, but are also a threat to the financial sustainability of the health care sector. Closer collaboration between engineers and health economists is important to face of this societal challenge.

Mouter N, Boxebeld S, Kessels R, van Wijhe M, de Wit

A, Lambooij M, van Exel J. Public preferences for policies to promote COVID-19 vaccination uptake: a discrete choice experiment in the Netherlands. Value in Health 2022 Aug;25(8):1290-1297

Himmler S, van Exel J, Brouwer W. Did the COVID-19 pandemic change the willingness to pay for an early warning system for infectious diseases in Europe? The European Journal of Health Economics 2022;23: 81-94.

Rotteveel AH, Lambooij MS, van Exel NJA, de Wit GA. To what extent do citizens support the disinvestment of healthcare interventions? An exploration of the support for four viewpoints on active disinvestment in the Netherlands. Social Science & Medicine 2022; 293: 114662.

Mouter N, de Ruijter A, de Wit A, Lambooij M, van Wijhe M, van Exel J, Kessels R. "Please, you go first!" Preferences for a COVID-19 vaccine in the Netherlands. Social Science & Medicine 2022;292: 114626.

Reckers-Droog V, van Exel J, Brouwer W. Willingness to Pay for Health-Related Quality of Life Gains in Relation to the Disease Severity and Age of Patients. Value in Health 2021;24(8): 1182-1192.

Himmler S, Stöckel J, van Exel J, Brouwer W. The Value of Health: Empirical Issues when Estimating the Monetary Value of a QALY Based on Well-Being. Health Economics 2021;30(8): 1849-1870.).

15:00 ***Take home message and closing***

Prof. Dr. Levente Kovács, Rector Óbuda University

PROF.DR. ANDREA DE GAETANO, DHC

Andrea De Gaetano is a biomathematician with Director of Research (full professor) tenure with CNR since 2001, currently working as Director of the CNR Institute for Biomedical Research and Innovation. A certified emergency surgeon by training (Italy), he attained both M.Sc. (USA) and Ph.D. (France) degrees in Applied Mathematics, is a J.D. with Italian Bar license and has received a Doctor Honoris Causa (Statistics) from Óbuda University, Budapest. He is Adjunct Professor of Mathematical Statistics, Mahidol University Dept. of Mathematics, Bangkok Thailand.

His research interests focus on the mathematical modelling of physiological systems with ODEs, Stochastic and Fractional differential equations, and on the attending estimation of the model parameters from experimental observations. He has published so far over 200 full-length papers on international peer-reviewed journals, largely on the mathematical modelling of energy metabolism (Google Scholar metrics: 250 documents, 9879 citations, h-index 44). He has taught Mathematical Statistics at the Universities of Urbino, Copenhagen and Mahidol Bangkok. He has obtained approx 4.5 MEuro funding for research through a series of EC-financed FP and H2020 projects as well as several Italian projects (Ministry of Research, Ministry of Defense). He has been president of the European Society for Mathematical and Theoretical Biology, as well as Italian National Academic delegate at the NATO STO Human Factors and Medicine Panel and at the European Defense Agency Captech Simulation.

Google Scholar
citations: 9882
Hirsch index: 44

PROF. DR. SEYEDALI MIRJALILI

Professor Seyedali Mirjalili is the founding director of the Centre for Artificial Intelligence Research and Optimization at Torrens University Australia. He is internationally recognized for his advances in Optimization and Swarm Intelligence, including the first set of algorithms from a synthetic intelligence standpoint - a radical departure from how natural systems are typically understood - and a systematic design framework to reliably benchmark, evaluate, and propose computationally cheap robust optimization algorithms. Prof. Mirjalili has published over 300 publications with over 50,000 citations and an H-index of 77. He has been on the list of 1% highly-cited researchers and named as one of the most influential researchers in the world by Web of Science for three consecutive years. In 2021, The Australian newspaper named him as the top researcher in Australia in three fields of Artificial Intelligence, Evolutionary Computation, and Fuzzy Systems. Prof. Mirjalili is a senior member of IEEE and an editor of several AI journals including Neurocomputing, Applied Soft Computing, Advances in Engineering Software, Computers in Biology and Medicine, Healthcare Analytics, Decision Analytics, and Applied Intelligence. His research interests include Optimization, Swarm Intelligence, Evolutionary Algorithms, and Machine Learning.

citations: 54663
Hirsch index: 77

PROF. DR. AMIR H. GANDOMI

Amir H. Gandomi is a Professor of Data Science and an ARC DECRA Fellow at the Faculty of Engineering & Information Technology, University of Technology Sydney. Prior to joining UTS, Prof. Gandomi was an Assistant Professor at Stevens Institute of Technology, USA and a distinguished research fellow at BEACON center, Michigan State University, USA. Prof. Gandomi has published over three hundred journal papers and 12 books which collectively have been cited 31,000+ times (H-index = 81). He has been named as one of the most influential scientific minds and recognized by Highly Cited Researcher award (top 1% publications and 0.1% researchers) for five consecutive years, 2017 to 2021. He is ranked 17th in GP bibliography among more than 15,000 researchers and ranked as the 59th most impactful researcher in the area of AI and Image Processing based on a study led by Stanford University. Prof. Gandomi has received multiple prestigious awards for his research excellence and impact, such as the 2022 Walter L. Huber Prize which is known as the highest level mid-career research award in all areas of civil engineering. He has served as associate editor, editor, and guest editor in several prestigious journals such as AE of IEEE TBD, IEEE Networks, and IEEE IoTJ. Prof Gandomi is active in delivering keynotes and invited talks. His research interests are global optimisation and (big) data analytics using machine learning and evolutionary computations in particular.

citation: 31354
Hirsch index 81

PROF. DR. RUDOLF ANDOGA

Rudolf Andoga works as a head of Department of Avionics and a professor at Faculty of Aeronautics, Technical University of Košice as well as the head of the Laboratory of intelligent control systems of aircraft engines..

He obtained the title of engineer in 2003 in the field of artificial intelligence. In 2014, he successfully completed the habilitation procedure and defended his habilitation thesis on the topic *„Progressive algorithms in aircraft cybernetic systems"* in the field of electronics.

In 2021 he successfully presented his inaugural lecture entitled Computational cybernetics in the context of methods of education of aerospace engineering specialists in the integrated field of study – Transport and was appointed his full professor title in 2022.

Scientific profile of prof. Ing. Rudolf Andoga, PhD. is focused on the field of aerospace engineering, is oriented mainly on the aircraft engines control systems and the design of automatic flight control systems with the application of modern methods and approaches of computational intelligence and digitization. In the international database *„Web Of Science"* he records 70 publications, 361 citations and with H-index 12. He is the author and co-author of total 221 publications with 5 scientific monographs, 6 education texts, 49 scientific journal papers, 67 papers published in international conference proceedings, 1 patent and others.

prof Ing. Rudolf Andoga, PhD. in his career has also been an active member of different committees and professional organizations. The most notable ones being

- Editorial Board track chair for Informatics of the scientific journal Acta Polytechnica Hungarica, ISSN 2064-2687, 1785-8860 (Web of Science, JCR IF = 1.286),

- Visiting editor / editor of a special issue of the internationally peer-reviewed Current Contents Open Access journal Energies, ISSN: 1996-1073, published by MDPI AG Basel, Switzerland, ISSN: 1996-1073, (2020 - present) (Web of Science, JCR IF = 2.702
- Technical Program Committee chair and co-chair of the International IEEE Conference INES (Intelligent Engineering Systems) in the years 2015/2016/2017/2018/2019/2020/2021/2022.
- Technical Program Committee chair and co-chair of the International IEEE Conference SAMI (World Symposium on Applied Machine Intelligence) in 2019/2020/2021/2022
- Technical Program Committee chair and co-chair of the International IEEE Conference CINTI (International Symposium on Computational Intelligence and Informatics) in 2018/2019/2020/2021/2022
- Member of the Computational Cybernetics Technical Committee within the IEEE Systems Man and Cybernetics chapter.
- Associate member of the Scientific Board of the Czech Technical University, Faculty of Transport

citation: 798
Hirsch

PROF. DR. ALEXANDRU KRISTÁLY, DSC

Alexandru Kristály is a Full Professor at Babes-Bolyai University, Cluj, Romania and at Óbuda University, Budapest, Hungary.

He is a mathematician, working in the interface of Calculus of Variations and Geometric Analysis. He investigates various nonlinear phenomena arising from mathematical physics and (synthetic or differential) geometry where the curvature of the ambient space has a decisive role.

He received PhD degrees from the Babes-Bolyai University (2003), University of Debrecen (2005) and Central European University (2010). Habilitated both at the Babes-Bolyai University (2013) and Óbuda University (2015), he also received the title of Doctor in Science from the Hungarian Academy of Sciences (2019). He is a supervisor of 7 PhD Students (3 of them completed their studies).

He published 81 scientific articles in peer reviewed journals, writing monographs at Cambridge University Press (2010) and Springer (2021), being cited in top mathematical journals by leading mathematicians, including also Fields medalists.

Number of D1 publications: 27. Number of Q1 (not D1) publications: 33. Number of Q2/Q3/Q4 publications: 18/2/1. Total ISI journal publications (D1+Q1+...+Q4): 81.

Google Scholar Citations: 1890. H-index (Google Scholar): 24. MathSciNet: 1102 citations by 661 authors.
Detailed publication list: https://m2.mtmt.hu/gui2/?type=authors&mode=browse&sel=10002077

Web: https://alexandrukristaly.wordpress.com/

PROF. DR. LÁSZLÓ SZILÁGYI

László Szilágyi is full professor at Sapientia Hungarian University of Transylvania, Cluj, Romania, and associate professor at Óbuda University, Budapest, Hungary.

He received MSc degree in automation and industrial informatics (engineering) from Petru Maior University of Tîrgu Mureș, Romania (1998), and PhD degree in electrical engineering from Budapest University of Technology and Economics, Hungary (2009). He habilitated at Babes-Bolyai University (2017). Currently he supervises 5 PhD students at Óbuda University.

His research interests include image processing and pattern recognition, modeling and simulation of physiological systems, bioinformatics, infection control strategies, artificial intelligence, clustering algorithms.

He is editorial board member of the journal Acta Polytechnica Hungarica, and program committee member of the international conference on Modeling Decisions for Artificial Intelligence (MDAI) since 2012.

He published 29 scientific articles in peer reviewed journals and 150+ peer reviewed conference papers. His paper entitled *"MR brain image segmentation using an enhanced fuzzy c-means algorithm"* (2003) is the 3rd most cited work (out of 40,155) from the 43-year old history of the Annual International Conference of the IEEE Engineering in Medicine and Biology Society. His paper entitled *"A fast hierarchical clustering algorithm for large-scale protein sequence data sets"* was selected among the Top 10 Papers of Year 2014 published in the journal Computers in Biology and Medicine. He received the János Bolyai Research Fellowship Award of the Hungarian Academy of Sciences twice, in 2010 and 2018.

He is co-author of US Patent 9,424,735 B2 (2016) *"Method and apparatus for hand disinfection control quality"*, and co-founder of the Hand-In-Scan Zrt. (https://www.handinscan.com) startup company relying on this multiple award winner technology.

His detailed list of publications list is available at: https://m2.mtmt.hu/gui2/?type=authors&mode=browse&sel=10013789

Google Scholar
citations: 3010
Hirsch index: 19

PROF. DR. JOB VAN EXEL

Prof. Dr. Job van Exel is Professor of Economics at Erasmus School of Health Policy & Management of Erasmus University Rotterdam. He is also head of the Department of Health Economics and co-director of the Erasmus Choice Modelling Centre. He started his professional career as a consultant in transportation at the Netherlands Economic Institute (1995-2000), focussing on the economic evaluation of investments in transport infrastructure, the pricing of mobility, and the analysis of travel behaviour. Next, he joined the Institute for Medical Technology Assessment as senior researcher (2000-2006), focussing on the economic evaluation of new pharmaceuticals, treatment strategies and organisation of health and social care. Since 2006, he is affiliated with Erasmus School of Health Policy & Management, with several leadership roles in research, teaching, and management. In 2016, he was appointment as Professor at Erasmus School of Economics, and in 2020, he was appointed as Professor at Erasmus School of Health Policy & Management.
His research and teaching focus on the improvement of methods for economic evaluations in health and social care and the analysis of preferences and behaviours is the context of health. He also has worked on methods for involving citizens and patients in decision-making in the healthcare sector. Recent work is focused on the connection between climate change and health.
Over the past 20 years, he has collaborated with academic and non-academic partners in national and international research projects and networks, and he has initiated several multi-disciplinary collaborations, most recently with Technical University Delft. To date, he has published over 200 scientific papers and has successfully supervised 16 PhD students (and 10 ongoing).