



25-27 June 2019

Zilina - Slovakia



Program of  
The International Conference on  
**Information and Digital  
Technologies 2019**



• Visegrad Fund



## Preface

We have a pleasure to present you the *Program of International Conference on Information and Digital Technologies (IDT 2019)*. IDT 2019 provides a forum for presentation and discussion of scientific contributions covering the theories and methods in the field of information and digital technologies and their application to a wide range of industrial, civil and social sectors and problem areas. IDT 2019 is also an opportunity for researchers, practitioners, academics and engineers to meet, exchange ideas, and establish mutual cooperation. IDT 2019 offers a multidisciplinary platform to address the technological, societal, and financial aspects of information systems.

The Conference program includes several workshops that cover numerous aspects of information and digital technologies:

- *International Workshop on Biomedical Technologies;*
- *International Workshop on New Frontier Information Digital Technology;*
- *International Workshop on Computer-aided Modeling;* etc.

In the time of the Conference, *International Workshop on Reliability and Safety Technologies* is also organized. This workshop thematically broadens conference subjects by challenges in development of highly reliable systems. We would like to thank colleagues who organized these Workshops.

Initially, more than a hundred papers were submitted for the review. More than half of these submissions were recommended by reviewers for the presentation in the Conference and publishing in the proceedings. The review process was organized mainly by the Workshop chairs and the process was made by a large number of reviewers, which are gratefully acknowledged for their contributions to the improvement of quality of the accepted papers. Each paper was reviewed by at least two anonymous reviewers in order to ensure fair and high-quality reviews.

In addition to regular sessions, IDT 2019 offers the following distinguished keynote lectures:

- *Digital re-engineering for safety management* by prof. Coen van Gulijk (Institute of Railway Research, University of Huddersfield, United Kingdom);
- *Artificial intelligence meets clinical imaging for personalized medicine in oncology* by prof. Paolo Soda (Campus Bio-Medico University in Roma, Italy);
- *Opportunities and Challenges of the Reliability of AI Systems* by prof. Min Xie (City University of Hong Kong, Hong Kong);
- *Reliability of Smart Grids* by prof. Marko Čepin (University of Ljubljana, Slovenia).

We thank the keynote speakers for offering their unique perspectives on information and digital technologies at the Conference.

One of the conference objectives is to assemble participants from universities and industry from around the world and encourage their cooperation. For this purpose, *Industrial Centre* has been prepared and organized within the Conference. The preparation of this Centre has been supported by *International Visegrad Fund* (Grant No. 21830315). IT companies from Slovakia, Czech Republic, Poland, and Hungary are involved in the exhibition and special discussion section organized under this Centre.

We gratefully acknowledge *Faculty of Management Science and Informatics of the University of Zilina*, *European Reliability and Safety Association (ESRA)*, *International Visegrad Fund*, the *Czechoslovakia Section of IEEE*, and *IEEE Czechoslovakia Section Reliability Society Chapter* for the sponsoring, organizational, and technical support.

We also thank all the contributed authors for their submissions and presentations.

Organization team of IDT 2019

# IDT 2019 Programme Committee

Chair:	Zio Enrico, France, Italy
Co-Chairs:	Pancerz Krzysztof, Poland
	Zaitseva Elena, Slovakia
Ablameyko Serge, Belarus	Kvassay Miroslav, Slovakia
Aven Terje, Norway	Levashenko Vitaly, Slovakia
Barach Paul, USA	Levitin Gregory, Israel
Baraldi Piero, Italy	Lisnianski Anatoly, Israel
Bracco Fabrizio, Italy	Lukac Martin, Kazakhstan
Beer Michael, United Kingdom	Lukyanchuk Igor, France
Berenguer Christophe, France	Majernik Jaroslav, Slovakia
Bielikova Maria, Slovakia	Matiasko Karol, Slovakia
Borgonovo Emanuele, Italy	Moraga Claudio, Germany
Brinzei Nicolae, France	Navara Mirko, Czech Republic
Bris Radim, Czech Republic	Pastor Luis, Spain
Cepin Marko, Slovenia	Pedroni Nicola, France
Cocherova Elena, Slovakia	Perkowski Marek, USA
Coolen Frank, United Kingdom	Podofillini Luca, Switzerland
Czapp Stanislaw, Poland	Rauzy Antoine, Norway
Deserno Thomas, Germany	Sasao Tsutomu, Japan
Di Maio Francesco, Italy	Simic Zdenko, Netherlands
Filatova Daria, Poland	Soda Paolo, Italy
Fiser Petr, Czech Republic	Stankevich Sergey, Ukraine
Frenkel Ilia, Israel	Stankovic Radomir, Serbia
Kameyama Michitaka, Japan	Steinbach Bernd, Germany
Kharin Yuriy, Belarus	Subbotin Sergey, Ukraine
Kharchenko Vyacheslav, Ukraine	Sztrik Janos, Hungary
Kolowrocki Krzysztof, Poland	van Gulijk Coen, United Kingdom
Kor Ah-Lian, United Kingdom	Viergever Max, Netherlands
Kostolny Jozef, Slovakia	Xie Min, Hong Kong
Krsak Emil, Slovakia	Yanushkevich Svetlana, Canada

## Organizing Committee

<b>Chair:</b> Rabcan Jan, Slovakia	Kvet Marek, Slovakia
Chovancova Olga, Slovakia	Kvet Michal, Slovakia
Ceresnak Roman, Slovakia	Macekova Denisa, Slovakia
Forgac Andrej, Slovakia	Rusnak Patrik, Slovakia
Ilovska Anna, Slovakia	Vaclavkova Monika, Slovakia
Kajanek Frantisek, Slovakia	Varga Michal, Slovakia
Kello Tomas, Slovakia	Sedlacek Peter, Slovakia

# IDT 2019 Time Schedule

<b>Monday, June 24, 2019</b>				
16:00-19:00	Early registration			
<b>Tuesday, June 25, 2019</b>				
08:00-10:15	Registration			
10:15-10:30	Opening of the Conference (room C-9)			
10:30-11:30	<b>The First Plenary Section</b> (room C-9)			
11:30-12:00	Coffee/tea			
12:00-13:00	Section IC1 (room C-9)			
13:00-14:00	Lunch			
14:00-15:40	Section RaST1 room C-1	Section I1 room C-6	Section D1 room C-9	Section ET room RA003
15:40-16:00	Coffee/tea			
16:00-18:00	Section RaST2 room C-1	Section I2 room C-6	Section C1 room C-9	Section IC2 room RA003
18:00-20:00	Reception			
<b>Wednesday, June 26, 2019</b>				
08:40-12:30	IDT Exhibition* (atrium FRI)			
08:40-10:00	Section RaST3 room C-1	Section N1 room C-6	Section D2 room C-9	Section BT room RA003
10:00-10:30	Coffee/tea			
10:30-11:30	<b>The Second Plenary Section</b> (room C-9)			
11:30-12:30	Section IC3 (room C-9)			
12:30-13:30	Lunch			
13:30-21:30	Tour of the Banská Štiavnica Castle and dinner			
<b>Thursday, June 27, 2019</b>				
09:00-10:40	Section RaST4 room C-1	Section N2 room C-6	Section C2 room C-9	Section IC4 room RA003
10:40-11:00	Coffee/tea			
11:00-13:00	<b>The Third Plenary Section</b> (room C-9)			
13:00-14:00	Lunch			
14:00-15:40	Section IC5 (room C-9)			
15:40-17:00	Section RaST5 room C-1		Section C3 room C-9	Section IC6 room RA003
17:00-17:15	Closing ceremony (room C-9)			

# Detailed Schedule

**Venue:** Faculty of Management Science and Informatics,  
University of Žilina (FRI, UNIZA)

**Tuesday, June 25, 2019**

## Opening of the Conference

**10:15-10:30 (room C-9)**

*The Conference Opening*

Prof. Elena Zaitseva

*Welcome words from the University of Žilina*

Prof. Karol Matiasko

*Welcome words of the Dean of the Faculty*

Dr. Emil Krsak

## The First Plenary Section

**10:30-11:30 (room C-9)**

**Moderators:** Prof. Frank Coolen, United Kingdom

**Assistant:** Ing. Roman Ceresnak, Slovakia

**Prof. Coen van Gulijk** (Institute of Railway Research, University of Huddersfield, United Kingdom)

*Digital re-engineering for safety management*

## Section IC1: Industrial Centre

**12:00-13:00 (room C-9)**

**Moderators:** Prof. Radim Bris, Czech Republic

**Assistant:** Ing. Roman Ceresnak, Slovakia

Marko Čepin

*European Safety and Reliability Association (ESRA) presentation*

Matej Pacha (IEEE)

*Industry-oriented activities of IEEE Czechoslovakia Section*

Milos Zatko (Simcon)

*Simulation of transportation logistic terminals*

## Section RaST1: Reliability and Safety Technologies

14:00-15:40 (room C-1)

**Chair:** Prof. Zdenko Šimić, The Netherlands

**Assistant:** Ing. Peter Sedlacek, Slovakia

Asamh Al Luhayb, Tahani Coolen-Maturi, and Frank Coolen

*Smoothed Bootstrap for Survival Function Inference*

Ekaterina Danilova

*Comparison of the genetic algorithms to build a diagnostic tree for diagnosing single stuck-at failures*

Grâce Boyer, Jean-François Pétin, Nicolae Brînzei, Jacques Camerini, and Moulaye Ndiaye

*Towards generation of dependability assessment models for industrial control system*

Zdenko Šimić and Reni Banov

*Are events with different significance correlated? Quantitative analysis of the correlation between events with different safety significance*

Michal Mrena, Peter Sedlacek, and Miroslav Kvassay

*Practical Applicability of Advanced Implementations of Priority Queues in Finding Shortest Paths*

## Section I1: Information Technologies

14:00-15:40 (room C-6)

**Chair:** Dr. Michal Kvet, Slovakia

**Assistant:** Ing. Tomas Kello, Slovakia

Aleksey Stepovoy, Alexander Bazhanov, Vasily Rubanov, and Roman Vashchenko

*Application of artificial neural networks for building sensors models of physical quantity*

Michal Kvet

*Data distribution in ad-hoc transport network*

Lenka Příbylová, Radim Briš, Lubomír Martínek, and Vladimír Benčurik

*The use of survival analysis to investigate risk factors for anastomotic leak*

Roman Čerešňák and Michal Kvet

*Comparison Apaches for Distributed Processing*

Tomas Kello and Emil Kršák

*Analyze train data set with use of linear regression and cloud systems*

## Section D1: Dynamical Systems and Real World Applications

14:00-15:40 (room C-9)

**Chair:** Prof. Oleksandra Yeremenko, Ukraine

**Assistant:** Dr. Michal Varga, Slovakia

Patrik Vasilovsky, Michal Kohani, and Peter Jankovic

*Simulation verification of location of charging stations for electric buses*

Mohamed Hedi Zaghouani, János Sztrik, and Melikov Agassi

*Reliability Analysis of Cognitive Radio Networks*

Oleksandr Lemeshko, Maryna Yevdokymenko, Oleksandra Yeremenko, Amal Mersni, Pavel Segeč, and Jozef Papán

*Quality of Service Protection Scheme under Fast ReRoute and Traffic Policing Based on Tensor Model of Multiservice Network*

Agata Szultka, Seweryn Szultka, Stanislaw Czapp, and Jacek Klucznik

*Selection of Energy Storage Units by Genetic Algorithm for Mitigating Voltage Deviations*

Adrian Paun, Radu Vasil, Lia Dolga, Hannelore Filipescu, Flaviu Mihai Frigura-Iliasa, and Ionel Balcu

*Power Management and Control for a Photovoltaic Electricity Station*

## Section ET: Education

14:00-15:40 (room RA003)

**Chair:** Dr. Miroslav Kvassay, Slovakia

**Assistant:** Ing. Jan Rabcan, Slovakia

Baptiste Jacquet, Alexandre Hullin, Jean Baratgin, and Frank Jamet

*The Impact of the Gricean Maxims of Quality, Quantity and Manner in Chatbots*

Lenka Urbanská and Jaroslav Majerník

*Teaching IT Courses at PJSU Faculty of Medicine*

Patrik Voštinár and Nika Klimová

*Experience with Using Robots for Teaching Programming*

Jaroslav Majerník, Lenka Urbanská, and Andrea Kačmariková

*Improving the Quality of Human Anatomy Teaching using Online Repository of Cadaveric Dissections: Perceptions of Medical Students*

Jan Rabcan, Patrik Rusnak, Denisa Macekova, and Miroslav Kvassay

*Evaluation of data reliability based on mathematical approach of importance analysis*

## Section RaST2: Reliability and Safety Technologies

16:00-18:00 (room C-1)

**Chair:** Dr. Attila Kuki, Hungary

**Assistant:** Ing. Peter Sedlacek, Slovakia

Attila Kuki, Tamás Bérczes, János Sztrik, and Ádám Tóth

*Reliability Analysis of a Two-Way Communication System with Searching for Customers*

Radim Briš and Nuong Thi Thuy Tran

*A Time Based Maintenance Policy Model for Unavailability Analysis of Dormant Systems*

Andrej Forgáč and Igor Luykanchuk

*New algorithm for Multi-Valued Decision Diagram construction*

Tien T. Thach and Radim Bris

*Hamiltonian Monte Carlo method for parameter estimation of the additive Weibull distribution*

Daniel Krpelík, Frank P. A. Coolen, and Louis J. M. Aslett

*On Robust Markov Analysis for Reliability Assessment of Complex Systems using Imprecise Markov Chains*

Marek Kliment, Peter Trebuňa, and Jozef Trojan

*Optimizing the manufacturing process on the surface treatment line by using TX Plant Simulation software tool*

## Section I2: Information Technologies

16:00-18:00 (room C-6)

**Chair:** Dr. Marek Kvet, Slovakia

**Assistant:** Ing. Tomas Kello, Slovakia

Peter Lukáč and Peter Tarábek

*Improving DNN solution using repeated training*

Vladyslav Aliksieiev

*Artificial Locust Swarm Routing Algorithm: An Approach to Consider both Routing via FRA and Applying RAD*

Olga Chovancova, Lucia Piatrikova, and Adam Dudas

*Using Nature-Inspired Meta-Heuristic Algorithms to Improve Accuracy of Fuzzy C-Means Algorithm*

Sergey Stankevich, Mykola Lubskyi, and Andrej Forgac

*Thermal infrared satellite imagery resolution enhancement with fuzzy logic bandpass filtering*

Marek Kvet

*Complexity and Scenario Robust Service System Design*

Alexander Bazhanov, Roman Vashchenko, and Vasily Rubanov

*To the creation of an automated system of emergency and abnormal modes diagnosis for the mobile robotic trolley based on fuzzy behaviour charts*



## Section C1: Computer-aided Modeling

16:00-18:00 (room C-9)

**Chair:** Prof. Charles El-Nouty, France

**Assistant:** Dr. Michal Varga, Slovakia

Darya Filatova

*Production process balancing: a two-level optimization approach*

Damian Krzesimowski

*Usefulness of the single period of a periodic signal to assessment a human voice stability*

Dorota Bochnacka

*Optimal management of supply chain: M2M approach*

Alzbeta Bohinikova and Katarína Bachratá

*Computational Model of Optical Stretcher*

Michal Varga and Norbert Adamko

*Definition of agent goals in the term of missions*

Krzysztof Grysa and Artur Maciąg

*Identification of the skin surface temperature caused by the temperature of tissue inflammation*

## Section IC2: Industrial Centre

16:00-18:00 (room RA003)

**Chair:** Prof. Zdenek Vintr, Czech Republic

**Assistant:** Ing. Jan Rabcan, Slovakia

Martin Gandler, Florian Eibensteiner, and Josef Langer

*3D Printable Sensors for Smart Textiles*

Szilvia Szeghalmy, Attila Fazekas, and Marianna Zichar

*Smartphone based driver-assistance system for urban environments*

Phillip Petz, Florian Eibensteiner, and Josef Langer

*Performance Evaluation of Conductive Textiles for Movement Pattern Recognition in Smart Socks*

Jaroslav Majerník and Lenka Urbanská

*Implementation of e-Assessment Management System into the ICT Infrastructure of University Education*

Xuan Phong Cu and Zdenek Vintr

*Reliability Estimation of Electronic Components by Step-Stress Accelerated Reliability Testing*

Maroš Janovec and Michal Koháni

*Battery degradation impact on the electric bus fleet scheduling*

**Wednesday, June 26, 2019**

## **IDT Exhibition**

**08:40-12:30 (atrium FRI UNIZA)**

**Moderator: Prof. Elena Zaitseva, Slovakia**

## **Section RaST3: Reliability and Safety Technologies**

**08:40-10:00 (room C-1)**

**Chair: Prof. Andriy Luntovskyy, Germany**

**Assistant: Ing. Peter Sedlacek, Slovakia**

Andriy Luntovskyy

*Performance, Reliability and Scalability for IoT*

Zbigniew Matuszak

*Estimating the reliability of mechatronic devices and systems with fixed and variable working structure*

Peter Sedlacek, Jan Rabcan, and Jozef Kostolny

*Importance Analysis of Multi-State System Based on Incompletely Specified Data By Multi-Valued Decision Diagrams*

Mykhailo Popov, Oleksandr Zaitsev, and Irina Piestova

*A Method for Determining Priorities Between Competing Interval-Valued Estimates of Experts*

## **Section N1: New Frontier Information Digital Technology**

**08:40-10:00 (room C-6)**

**Chair: Prof. Michitaka Kameyama, Japan**

**Assistant: Ing. Tomas Kello, Slovakia**

Martin Lukac, Claudio Moraga, and Michitaka Kameyama

*Properties of Bent Functions in the Truth Domain*

Jarosław Szkoła and Krzysztof Pancierz

*Pattern Recognition in Sequences Using Multistate Sequence Autoencoding Neural Networks*

Kenichi Takada and Michitaka Kameyama

*Moving Image Scene Recognition and Its Application to Highly-Safe Intelligent Systems*

Wiesław Paja

*Generational Feature Selection using Random Forest Approach*

## Section D2: Dynamical Systems and Real World Applications

**08:40-10:00 (room C-9)**

**Chair: Dr. Iwona Dolińska, Poland**

**Assistant: Ing. Roman Ceresnak, Slovakia**

Krzysztof Dobrzynski, Stanislaw Czapp, Jacek Klucznik, Zbigniew Lubosny, Janusz Grala, Slawomir Noske, and Dominik Falkowski

*Energy Losses Reduction in the Medium Voltage Cable Line – Case Study*

Iwona Dolińska, Mariusz Jakubowski, and Antoni Masiukiewicz

*New IEEE 802.11 HEW standard throughput per user analysis*

Iwona Dolińska, Mariusz Jakubowski, and Antoni Masiukiewicz

*Accelerated Exhaustive Algorithm Implementation for Channel Assignment in 802.11 Networks*

Dariusz Tarnapowicz, Sergey German-Galkin, and Edward Jarlaczyński

*Testing of a prototype of a two-segment low-speed generator with permanent magnet for a lower-power wind farm*

## Section BT: Biomedical Technologies

**08:40-10:00 (room RA003)**

**Chair: Prof. Paolo Soda, Italy**

**Assistant: Ing. Frantisek Kajanek, Slovakia**

František Kajánek and Ivan Cimrák

*Evaluation of Detection of Red Blood Cells using Convolutional Neural Networks*

Monika Smiešková and Katarína Bachratá

*Validation of Bulk Properties of Red Blood Cells in Simulations*

Adéla Vrtková and Václav Procházka

*Comparing the performance of regression models, random forests and neural networks for stroke patients' outcome prediction*

Mark Wachowiak, Jason Moggridge, and Renata Wachowiak-Smolikova

*Deep Embedded Clustering for Data-Driven ECG Exploration Using Continuous Wavelet Transforms*

## The Second Plenary Section

10:30-11:30 (room C-9)

**Moderators:** Prof. Marko Čepin, Slovenia

**Assistant:** Ing. Roman Ceresnak, Slovakia

**Prof. Paolo Soda** (Campus Bio-Medico University in Roma, Italy)

*Artificial intelligence meets clinical imaging for personalized medicine in oncology*

## Section IC3: Industrial Centre

11:30-12:30 (room C-9)

**Moderators:** Prof. Min Xie, Hong Kong

**Assistant:** Ing. Roman Ceresnak, Slovakia

Adrian Petrik and Jan Nezkusil (StaPro)

*eRadiology - sharing results effectively*

Pavel Sigeti and Juraj Kajan (TatraMed)

*Modern methods of radiological data imaging*

## Team building event: Tour to Banská Štiavnica

13:30-21:30+

**Section RaST4: Reliability and Safety Technologies**

**9:00-10:40 (room C-1)**

**Chair: Dr. Stanislaw Czapp, Poland**

**Assistant: Ing. Andrej Forgac, Slovakia**

Stanislaw Czapp and Daniel Kowalak

*Remarks on the Subject of Back-Up Protection of Residual Current Devices*

Bartosz Tarakan, Stanislaw Czapp, Krzysztof Dobrzynski, Ryszard Zajczyk, and Marcin Sarnicki

*Voltage Control in a Power System with Renewable Sources of Energy*

Ádám Tóth, János Sztrik, Attila Kuki, Tamás Bérczes, and Dmitry Efrosinin

*Reliability Analysis of Finite-Source Retrieval Queues with Outgoing Calls Using Simulation*

Calin Mihai Vinga, Francisc Demeter, Vlad Vatau, Flaviu Mihai Frigura-Iliasa, Marius Mirica, and Mirela Iorga

*Human Machine Interface for a Photovoltaic Electricity Station*

Mihaela Frigura-Iliasa, Felicia Baloi, Adrian Flavius Olariu, and Razvan Claudiu Petrenci

*Digital Mapping of Electric Field inside High Voltage Power Stations*

**Section N2: New Frontier Information Digital Technology**

**9:00-10:40 (room C-6)**

**Chair: Dr. Krzysztof Pancierz, Poland**

**Assistant: Ing. Tomas Kello, Slovakia**

Katerina Prihodova and Miloslav Hub

*Biometric Privacy through Hand Geometry- A Survey*

Janusz Kolbusz, Pawel Rozycki, Oleksandr Lysenko, and Bogdan Wilamowski

*Error Back Propagation Algorithm with Adaptive Learning Rate*

Tomasz Grebski, Krzysztof Pancierz, and Piotr Kulicki

*Experiments with Recognition of Melody Similarities Based on Human Independent Parameters*

Erik Kostelansky, Emil Kršák, and Tomas Kello

*Estimate train driving time with artificial intelligence*

Zain Ul Islam

*A Hybrid Approach For HandsFree Cursor Control*

## **Section C2: Computer-aided Modeling**

**9:00-10:40 (room C-9)**

**Chair: Prof. Darya Filatova, Poland**

**Assistant: Ing. Roman Ceresnak, Slovakia**

Charles El-Nouty

*Some comments on approximately stationary Gaussian processes*

Marzena Nowakowska, Karolina Bęben, and Michał Pajęcki

*A conceptual project for the organisation of road traffic crash and road traffic crash casualty data acquisition for research purposes*

Vladimir Sidorov, Pavel Akimov, and Alexander Belostotsky

*Computer-Aided Analysis of Mechanical Safety of Stadiums for the World Cup 2018 in Russia Part 1: Introduction, Creation of Finite Element Models, Structural Analysis at Basic Combinations of Loads and Impacts*

Vladimir Sidorov, Pavel Akimov, and Alexander Belostotsky

*Computer-Aided Analysis of Mechanical Safety of Stadiums for the World Cup 2018 in Russia Part 2: Structural Analysis at Special Combinations of Loads and Impacts, Structural Health Monitoring*

Tushar Kumar Yadav and Kunwar Singh

*Performance Optimization of OTA Using PSO Guided by Inversion Coefficient Theory*

Uladzimir Palukha and Yuriy Kharin

*Performance Analysis for Statistical Testing of Random and Pseudorandom Generators by Entropy Statistics*

## **Section IC4: Industrial Centre and Exhibition**

**9:00-10:40 (room RA003)**

**Chair: Dr. Hana Kopackova, Czech Republic**

**Assistant: Ing. Jan Rabcan, Slovakia**

René Lamber and Thomas Grechenig

*Quantitative Requirements Evaluation for a European Refugee Management System serving Migrants and Institutions*

Stanislava Šimonová and Meseret Yihun Amare

*Aspects of Digital Documents Archiving by the Organizations in the Czech Republic in Context of the EU eGovernment*

Sergey Stankevich, Elena Zaitseva, Iryna Piestova, Patrik Rusnak, and Jan Rabcan

*Satellite Imagery Spectral Bands Subpixel Equalization Based on Ground Classes' Topology*

Hana Kopackova, Jitka Komarkova, and Jakub Jech

*Technology helping citizens to express their needs and improve their neighborhood*

Jitka Komarkova, Pavel Sedlak, Stanislav Struska, and Andrea Dymakova

*Usability Evaluation the Prague Geoportal: Comparison of Methods*

## The Third Plenary Section

**11:00-13:00 (room C-9)**

**Moderators: Prof. Coen van Gulijk, United Kingdom**

**Assistant: Ing. Roman Ceresnak, Slovakia**

**Prof. Marko Čepin** (University of Ljubljana, Slovenia)

*Reliability of Smart Grids*

**Prof. Min Xie** (City University of Hong Kong, Hong Kong)

*Opportunities and Challenges of the Reliability of AI Systems*

## Section IC5: Industrial Centre

**14:00-15:40 (room C-9)**

**Moderators: Prof. Krzysztof Pancierz, Poland**

**Assistant: Ing. Patrik Rusnak, Slovakia**

Sebestyén Hunor Péter (SteadyJax)

*Establishing and maintaining the security and stability of websites*

Krzysztof Pancierz

*Research, education, business - selected examples of cooperation*

Alexander Bazhanov (SIGMA)

*Scientific and Industry potential of Science and Technology Center SIGMA*

Pavel Akimov and Alexander Belostotsky (StuDyO)

*Scientific and Industry potential of StuDyO Science & Research Center*

## Section RaST5: Reliability and Safety Technologies

15:40-17:00 (room C-1)

**Chair:** Prof. Elena Zaitseva, Slovakia

**Assistant:** Ing. Andrej Forgac, Slovakia

Mateusz Torbicki

*An Approach to Longtime Safety and Resilience Prediction of Critical Infrastructure Influenced by Weather Change Processes*

Herman Fesenko, Vyacheslav Kharchenko, and Elena Zaitseva

*Evaluating Reliability of a Multi-fleet with a Reserve Drone Fleet: an Approach and Basic Model*

Ewa Dąbrowska

*Monte Carlo Simulation based Optimization of Port Grain Transportation System Reliability*

Attila Bérczes, Tamás Bérczes, Imre Varga, Attila Tiba, and Judit Zsuga

*Using Laplacian spectrum to analyse the comorbidities network of haemorrhagic stroke*

Ewa Dąbrowska and Krzysztof Kołowrocki

*Stochastic Determination of Oil Spill Domain at Gdynia Port Water Area*

Mateusz Torbicki

*The Longtime Safety and Resilience Prediction of the Baltic Oil Terminal*

## Section C3: Computer-aided Modeling

15:40-17:00 (room C-9)

**Chair:** Dr. Iryna Piestova, Ukraine

**Assistant:** Ing. Patrik Rusnak, Slovakia

Ewa Dąbrowska and Krzysztof Kołowrocki

*Monte Carlo Simulation Applied to Oil Spill Domain at Gdynia Port Water Area Determination*

Talha Ali Khan, Khawaja Zain-Ul-Abideen, and Steve Ling

*A Modified Particle Swarm Optimization Algorithm Used for Feature Selection of UCI Biomedical Data Sets. A Modified Particle Swarm Optimization Algorithm for Solving DNA Multi-Objective Problem*

Mingyu Bai, Gaochao Xu, Zhiyi Fang, Hongliang Dong, Shinan Song, Jingbo An, Zhanyang Zhang, and Qinghu Wang

*The Performance Evaluation of Traffic Signal Timing Algorithms for Improved and Optimized Traffic Capability Performance Indexes*

Konstantin Kim and Valery Smagin

*Robust Filtering for Discrete Systems with Unknown Inputs & Jump Parameters*

Sanjay Kumar, Rohit Beniwal, Sudhanshu Singh, and Vipul Gupta

*Predicting Link Sign in Online Social Networks based on Social Psychology Theory and Machine Learning Techniques*



## Section IC6: Industrial Centre – CERES

**15:40-17:00 (room C-1)**

**Chair: Prof. Vitaly Levashenko, Slovakia**

**Assistant: Ing. Jan Rabcan, Slovakia**

Ladislav Burita and Taha Nejad Falatouri Moghaddam

*Analysis of Data from the Social Media*

Anett Rácz and Gergő Zilizi

*Virtual Reality Aided Historical Exhibition and Monument Reconstruction - “Vis comes true” – A virtual tour on Island of Vis*

Zdenek VINTR and Michal VINTR

*Current Collector Maintenance Optimization*

Nune Pratyusha and Santanu Mandal

*Hysteresis Loop-Area of Generic Memristor Emulator*

Pinar Kirci and Fatih Cambek

*Hand Gesture Detection*

Sanjay Patidar, Upendra Singh, Ashish Patidar, Riyaz Ali Munsoori, and Jypti Patidar

*Comparative Study on Face Detection by GPU, CPU and OpenCV*

## Welcome to the metropolis of Northwest Slovakia



Žilina is a natural centre of north-western Slovakia and with a population of 83 277 inhabitants (December 2018) it ranks among the largest cities in Slovakia. Žilina is situated around 200 km from Bratislava, the capital of Slovakia.

Žilina is located in the valley of the Váh river at the confluence of the Váh river with its tributaries Kysuca and Rajčanka. Žilina is surrounded by the mountain ranges of Malá Fatra (Lesser Fatra),

Strážovské vrchy (Strážov Hills), Súľovské vrchy (Súľov Hills), Javorníky, and Kysucká vrchovina (Kysuce Highlands).

Žilina is a centre of significant political, cultural, sport and public health care institutions. The city of Žilina is the seat of the Žilina Region. Together with the Region, it keeps a stable position of the second or third place in gross domestic product per inhabitant. Its economic potential can be proven by the fact that Žilina has the biggest number of traders per thousand inhabitants. As for the number of joint stock companies and limited companies, Žilina keeps third position in Slovakia. The Slovak Commercial and Industrial Chamber in Žilina is the second biggest in Slovakia.

Nowadays, the city of Žilina represents a dynamic development accelerated by KIA Motors Slovakia investments. However, the City is not only a centre of car production, but together with the Upper Váh River Region (Horné Považie), it is an interesting tourist destination.

Interesting events held in the city of Žilina and its surroundings during the year (Carnival Slovakia, Central European Festival of Concert Art, Old Town Festival, Folklore Festival in Terchová, Medieval Day, Rajec Marathon etc.) make the development of the City tourism more dynamic.

The city of Žilina is a centre of theatres, museums, galleries, parks and sports facilities. Its historical centre is crossed by one of the longest and the most beautiful pedestrian zones in Slovakia.



## Visit to Banská Štiavnica

Banská Štiavnica is a town in central Slovakia, which has more than 10,000 inhabitants. It is a completely preserved medieval town. Because of their historical value, the town and its surroundings were proclaimed by the UNESCO to be a World Heritage Site.



Banská Štiavnica has been closely linked to the exploitation of its abundant resources of silver ore. The first mining settlement was founded by Celts in the 3rd century BC. Old Slovak fortified settlement was situated here in the 10th and 11th century. The site was called “terra banensium” (the land of miners) as early as in 1156. The common name “Schebnyzbana” was documented for the first time in 1255. German settlers adapted the local name to the German "Schemnitz". Banská Štiavnica gained the status of a royal town in 1238, as one of the first towns in the Kingdom of Hungary.

In the Middle Ages, the town was the main producer of silver and gold in the Kingdom of Hungary. During the Ottoman Wars in the 16th century, Turks threat led Banská Štiavnica to build powerful fortifications, including two castles. The town was also a leading center of innovation in the mining industry. In 1627, gunpowder was used there in a mine for one of the first times in the world. To drain water from the flooded mines, a sophisticated system of water reservoirs and channels, known as tajchy, was designed and built by the local scientists Jozef Karol Hell, Maximilian Hell, and Samuel Mikoviny in the 18th century.

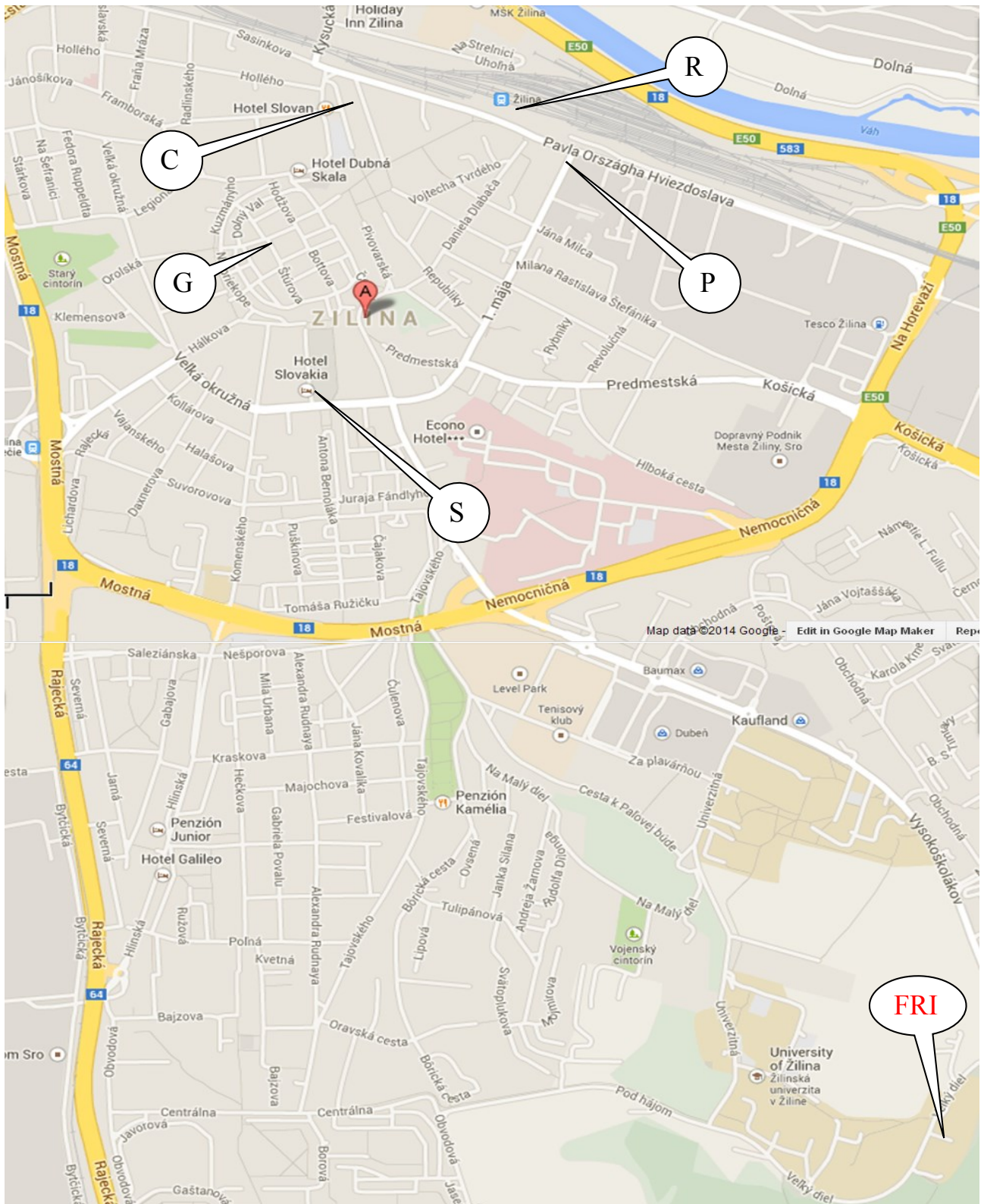
The first mining school in the Kingdom of Hungary was founded there in 1735. This school has been transformed into the Academy of Mining (1763). In 1807, a Forestry Institute was “established under the decision of Emperor Franz I”; in 1848 the school was renamed the Academy of Mining and Forestry, “the first technical university in the world”. The student traditions of the Academy are still living in its successors, the University of Miskolc and Slovak University of Technology in Bratislava, and colleges in Sopron, Székesfehérvár, and Dunaújváros.

In 1782, Banská Štiavnica was the third biggest town in the Kingdom of Hungary, after Pozsony (today Bratislava) and Debrecen. But the town's development was too closely linked to the mining activity which had been progressively declining since at the 19th century.



Nowadays, Banská Štiavnica is an important center of recreation and tourism, benefiting from its rich historical heritage.

# Map of Žilina



C – Hotel Central Park

G – Grand Hotel

P – Penzion Parz

S – Slovakia Hotel

A – Historical centrum of the city

R – Railway station (near auto station)

**FRI** – Faculty of Management Science and Informatics

Distance between A and R is near 10 minutes by foot.

Distance between S and FRI is near 25 – 30 minutes by foot.