



Program of

the International Workshop on Reliability Engineering and Computational Intelligence



UNIVERSITY OF ŽILINA
Faculty of Management Science
and Informatics

November 13 – 15, 2020
Delft, The Netherlands



The **Second International Workshop on Reliability Engineering and Computational Intelligence (RECI 2022)** aims to bring together researchers, developers, and teachers from academy as well as industry to discuss current trends of Reliability Engineering with application of methods of Artificial Intelligence, Data Mining, Knowledge Discovery and Computational Intelligence. The workshop is organized by *University of Žilina, Delft University of Technology, TNO* and *University of Huddersfield*.



Organization of the workshop is supported by the following projects:

- *New Methods Development for Reliability Analysis of Complex System* (Project APVV-18-0027 supported by the Slovak Research and Development Agency),
- *Safety Enterprise Architecture* (TNO project 060.51672/01.03: Occupational Safety Innovation/Huddersfield).

A special part of the workshop is a section on **Reliability Engineering and Computational Intelligence in Healthcare**. This section aims at discussion of relevant topics and trends of reliability engineering, data mining, and machine learning in healthcare, medicine, and biomedicine and is organized within the following project:

- *University-Industry Educational Centre in Advanced Biomedical and Medical Informatics (CeBMI)* (Project no.: 612462-EPP-1-2019-1-SK-EPPKA2-KA supported by the European Union's Erasmus+ programme).

The **Second Workshop on ACeSYRI: Modern Experience for PhD students and Young Researchers** is organized as an extra event of the RECI workshop. The main objective of the event is to bring together PhD students, young researchers, and teachers from the academy as well as industry working in Informatics. We expect that young workshop participants will obtain useful information about modern trends in Informatics. The young researchers will make also short presentations about their own research, and the workshop should allow them to discuss it with recognized experts. The Second Workshop on ACeSYRI is managed by the *Faculty of Management Science and Informatics of the University of Žilina* in cooperation with *Nazarbayev, Satbayev* and *Zhangir Khan West Kazakhstan Agrarian-Technical Universities*.



Organization of this extra event is supported by the following projects:

- *Advanced Centre for PhD Students and Young Researchers in Informatics (ACeSYRI)* (Project EACEA.CBHE no.: 610166-EPP-1-2019-1-SK-EPPKA2-CBHE-JP supported by the European Union's Erasmus+ programme).

Organization of all workshops is supported by *IEEE Chapter of Reliability Society of the Czechoslovakia Section, the European Safety and Reliability Association (ESRA),* and *Institute of Information Technologies*.



Website of RECI 2022:

<https://ki.fri.uniza.sk/RECI2022>

Website of ACeSYRI 2022:

<https://ki.fri.uniza.sk/ACeSYRI2022>



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RECI 2022 – Time Schedule with Links for Connection

**Start of workshop is 09:00 CET (UTC+1) or 14:00 ALMT (UTC+6).
All times in the program are specified in CET.**

10:00-17:00	Sunday, November 13, 2022	Workshop registration. Preparation of presentations. RECI centre of excellence discussion
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	Monday, November 14, 2022	Tuesday, November 15, 2022	Wednesday, November 16, 2022	Thursday, November 17, 2020	Friday, November 18, 2020
09:00-09:45	Registration	prof. Frank P.A. Coolen	Section ACeSYRI-1	Section ACeSYRI-2	Section ACeSYRI-3
09:45-10:00	Open				
10:00-10:15	prof. Ah-Lian Kor	Coffee/tea			
10:15-11:00		Section RECI-3			
11:00-11:15	Coffee/tea				
11:15-11:30	Section RECI-1	Coffee/tea			
11:30-11:45		Section RECI-4			
11:45-13:00					
13:00-14:00	Lunch				
14:00-15:00	prof. Piero Baraldi	RECI centre of excellence discussion			
15:00-15:15	Coffee/tea				
15:15-17:30	Section RECI-2	Section RECI-5			

Detailed Schedule

Monday, November 14, 2022

Opening of the Workshop RECI

[Click here to join.](#)

09:45-10:00 <i>The Workshop Opening</i>	Prof. Coen van Gulijk
<i>Welcome words from the RECI workshop</i>	Prof. Coen van Gulijk
<i>Welcome words from the ACeSYRI workshop</i>	Dr. Martin Lukac

The First Plenary Section

Moderator: Prof. Elena Zaitseva

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10:00-11:00

Prof. Ah-Lian Kor, Leeds Beckett University, UK

Expressive Cardinal Direction Representation and Reasoning

The First RECI Section. *Computational Intelligence and Its Applications I*

11:15-13:00

Moderator: Prof. Elena Zaitseva

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1. Sergey Stankevich, Elena Zaitseva, Anna Kozlova and Artem Andreiev, Fire Risk Assessment Using Earth Observation Data: A Case Study of the Eastern Carpathians at the Slovak-Ukrainian Frontier
2. Darya Filatova, Charles El-Nouty and Vladislav Istomin, Human-System Interaction: Toward Agressive Autonomous Driving
3. Selva Rivera, Jorge E. Núñez Mc Leod and Noelia Elizabeth Núñez Mac Leod, Creative Artificial Intelligence: Generation of New Objects or Concepts
4. Viktoria Sorokina and Sergey Ablameyko, Image-Based Technology for Creating a Catalog of E-Commerce Goods Using Neural Networks and Attention Model
5. Ivan Izonin, Roman Tkachenko, Bohdan Trush, Sviatoslav Nahirnyi, Homogeneous Ensemble Models based on ANNs with Non-Iterative Training: Classification and Regression Tasks
6. Jorge E. Núñez Mc Leod and Selva Rivera, Reliability Optimization of New Generation Nuclear Power Plants Using Artificial Intelligence
7. Aygul Hasanli, Analysis of Smart Tourism Development in Azerbaijan

The Second Plenary Section

Moderator: Prof. Coen van Gulijk

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14:00-15:00

Prof. Piero Baraldi, Department of Energy, Politecnico di Milano, Italy

Reliability: the Contribution of Computational Intelligence to Maintenance

The Second RECI Section. *Reliability Engineering and Risk Assessment*

15:15-17:30

Moderator: Prof. Coen van Gulijk

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1. *Peter Sedlacek*, Patrik Rusnak and Terezia Vrabkova, Software Tests Quality Evaluation Using Code Mutants
2. *Andriy Luntovskyy*, Advanced Networking and Cybersecurity Approaches
3. *Thijmen Zoomer*, Dolf van der Beek, Coen van Gulijk and Jan Harmen Kwantes, Algorithmic Safety Management for Workers
4. *Paul Singh*, Digital Safety Delivery
5. *Maryna Kolisnyk*, Axel Jantsch, Tanja Zseby and Vyacheslav Kharchenko, Markov Model of PLC Availability Considering Cyber-Attacks in Industrial IoT
6. *Patrik Rusnak* and Peter Sedlacek, Reliability Analysis of Data Storage Using Survival Signature and Logical Differential Calculus
7. *Sona Mammadli*, Matanat Mehrabova and Niyazi Hasanov, AB-Initio Calculations of Electron Band Structure of $Cd_{1-x}Fe_xS$
8. Robert W. Brewerton, *Sava Medonos* and Graham D. Warren, Risk to Water Resources and Life Safety from Hydraulic Fracturing

Tuesday, November 15, 2022

The Third Plenary Section

Moderator: Dr. Miroslav Kvassay

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09:00-10:00

Prof. Frank P.A. Coolen, Dept.of Mathematical Sciences, Durham University,UK
Reliability Evaluation of Multi-State Systems with Multi-State Components Using the Survival Signature

The Third RECI Section. *Computational Intelligence and Its Applications II*

10:15-11:15

Moderator: Dr. Martin Lukac

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1. *Martin Lukac* and Kamila Abdiyeva, Hacking DCNs
2. *Stanislav Sholtanyuk*, Crowd Abnormal Behaviour Patterns: Survey and Detection
3. Nataliya Gulayeva and *Mykhailo Kobieliev*, Development of a Chat-Bot Graphical Designer
4. *Olzhas Akylbekov* and Sabina Baidildinova, Customer Segmentation by Using SPSS Modeler

The Fourth RECI Section. *Reliability & Computational Intelligence in Healthcare*

11:30-13:00

Moderator: Dr. Miroslav Kvassay

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1. *Miroslav Kvassay*, Elena Zaitseva and Vitaly Levashenko, Importance of Reliability Analysis in Biomedical Informatics
2. *Eduard Kinshakov* and Yuliya Parfenenko, Application of Machine Learning Techniques to Solve the Problem of Skin Diseases Diagnosis
3. Camillo Maria Caruso, Ermanno Cordelli, Valerio Guarrasi, Giulio Iannello, Rosa Sicilia, Paolo Soda, Matteo Tortora, Lorenzo Tronchin, Bit-Omics: Exploiting Patient Digital Phenotypes for AI-Driven Next Generation Personalized Medicine
4. *Adam Mracko* and Ivan Cimrak, Databases of Mammography Images for Deep Convolutional Neural Networks
5. *Alzbeta Buganova* and Ivan Cimrak, Inertial Particle Focusing in Rectangular Wave Channel
6. *Jozef Kostolny*, Terezia Kiskova and Andrea Leskanicova, Analyzing Biomedical Data Using Classification Techniques
7. *Dominika Petrikova* and Ivan Cimrak, Automated Quantification of Ki67 Positive Cells for the Prediction of Ki67 Scores from H&E Stained Slides

The Fourth Plenary Section

Moderator: Prof. Coen van Gulijk

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14:00-15:00	All participants Discussion on centre of excellence in Reliability Engineering and Computational Intelligence
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The Fifth RECI Section. *Reliability Engineering & Computational Intelligence*

15:15-17:30

Moderator: Dr. Nicolae Brinzei

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1. *Vsevolod Fettsov*, Irbulat Utepbergenov and Nicolae Brinzei, Reliability of Multi-Purpose Synthesis System
2. *Elena Zaitseva*, Vitaly Levashenko and Miroslav Kvassay, Healthcare Safety
3. *Andriy Luntovskyy*, Dietbert Guetter, Technologies and Solutions for Smart Home & Smart Office
4. *Michal Mrena* and Miroslav Kvassay, Experimental Survey of Algorithms for the Calculation of Node Traversal Probabilities in Multi-Valued Decision Diagrams
5. *Sultan Albalwy*, Frank Coolen and Jonathan Cumming, Imprecise Statistical Inference Based on the Log-Rank Test for Step Stress Life Testing
6. *Daniel Krpelik*, Frank Coolen and Louis Aslett, A Method for Efficient Approximation of Survival Signatures of Large Systems via Evidence Theory
7. *Anas Alharshan*, Frank Coolen and Louis Aslett, The Number of Failed Components in a System of Multiple Types of Components Using Survival Signature
8. *Oleksandr Mamchych* and Maxim Volk, Smartphone Based Computing Clouds