



Critical Infrastructures in the Digital World

**IWCI PROGRAMME OF THE
2024 INTERNATIONAL WORKSHOP**

**March 14 – 20, 2024
Bolshoe Goloustnoe**

**CRITICAL INFRASTRUCTURES
IN DIGITAL WORLD - 2024
WORKSHOP
PROGRAMME**

March 14, 10:00

Thursday

Departure from Irkutsk at 10:00

Arrival in Bolshoe Goloustnoe

March 14, 20:00

OPENING CEREMONY

Welcome Party

March 20, 10:00

Wednesday

Departure of the participants to Irkutsk

March 15, 11:00

Friday

Baikal Greeting

OPENING OF THE WORKSHOP

March 15, 15:00

Friday

SESSION 1 (on-line)

1. Applying the principles of taxonomy to the specification of cyber-attacks and their impact on Smart Grid management systems / **Kolosok Irina**, Korkina Elena (*Melentiev Energy Systems Institute SB RAS, Irkutsk*)
2. Multidimensional statistical analysis of the impact of factors on the development of renewable energy in the regions of Russia / **Tatsiana Zoryna**^{1,2}, Angelina Matyushenko²
¹*Institute of Power Engineering, National Academy of Sciences of Belarus, Minsk, Republic of Belarus*
²*Belarusian State University, Minsk, Republic of Belarus*
3. DC-based Smart Grids / **Kudryavtsev Artem**, Zatssepina Violetta (*Lipetsk State Technical University, Lipetsk*)
4. Optimizing energy consumption in industry: a review of methods for forecasting electricity consumption in industrial enterprises / **Pavlov Ivan**, Zatssepina Violetta (*Lipetsk State Technical University, Lipetsk*)
5. Evaluation of the effectiveness of measures to create a comfortable urban environment based on neural network models / **Galagan Konstantin** (*Yugra State University, Khanty-Mansiysk*)
6. Approximation technology of multidimensional time series using nonlinear dynamic models on the plane / Gornov Alexander, **Zarodnyuk Tatiana**, Anikin Anton, Tyatyushkin Alexander (*Matrosov Institute for System Dynamics and Control Theory of SB RAS, Irkutsk*)
7. Hybrid algorithms for nonlocal optimization based on harmony search, firefly swarm, flower pollination and L-BFGS methods / **Sorokovikov Pavel** (*Matrosov Institute for System Dynamics and Control Theory of SB RAS, Irkutsk*)

GENERAL DISCUSSION

SESSION 2

1. Application of neural networks to simulate chemical kinetics / **Marchenko Mikhail** (*Institute of Computational Mathematics and Mathematical Geophysics of SB RAS, Novosibirsk*)
2. Construction of coverings of surfaces of revolution with geodesic circles / Kazakov Alexander¹, **Nguyen Duc Minh**²
¹*Matrosov Institute for System Dynamics and Control Theory of SB RAS, Irkutsk*
²*Irkutsk National Research Technical University, Irkutsk*
3. Collision-free path planning in dynamic environments using the optical-geometric approach / Lempert Anna¹, **Tran Tuan Viet**²
¹*Matrosov Institute for System Dynamics and Control Theory of SB RAS, Irkutsk*
²*Irkutsk National Research Technical University, Irkutsk*
4. Megalopolis passenger transport hub model in the form of a queuing network / Kazakov Alexander^{1,2}, **Vu Giang**², Zharkov Maxim¹
¹*Matrosov Institute for System Dynamics and Control Theory of SB RAS, Irkutsk*
²*Irkutsk National Research Technical University, Irkutsk*
5. Testbed-based approach to testing a library for evaluating network reliability algorithms / **Danilov Gleb**¹, Voskoboinikov Mikhail²
¹*Melentiev Energy Systems Institute SB RAS, Irkutsk*
²*Matrosov Institute for System Dynamics and Control Theory of SB RAS, Irkutsk*
6. Sheppard approximation / **Gornov Alexander** (*Matrosov Institute for System Dynamics and Control Theory of SB RAS, Irkutsk*)

Lecture for young scientists:**BASIC PRINCIPLES OF MATHEMATICAL MODELING**

Kazakov Alexander, Lempert Anna (*Matrosov Institute for System Dynamics and Control Theory of SB RAS, Irkutsk*)

SESSION 3

1. Ways to increase productivity in the development of complex information systems / **Erzhenin Roman** (*LLC "KRISTA-IRKUTSK"*)
2. Modeling of agricultural products during adverse events / Barsukova Margarita, Ivanyo Yaroslav, **Petrova Sofia**, Tsyrenzhapova Valentina (*Irkutsk State Agricultural University, Molodezhny*)
3. Electronic information and educational environment in monitoring university performance indicators / **Baimakov Aleksander**, Ivanyo Yaroslav, Fedurina Nina (*Irkutsk State Agricultural University, Molodezhny*)
4. About object recognition algorithms in solving some problems in animal husbandry / **Vashukevich Evgenii**, Ivanyo Yaroslav (*Irkutsk State Agricultural University, Molodezhny*)
5. Multilevel modeling in agricultural production planning / **Polkovskaya Marina**, Ivanyo Yaroslav, Petrova Sofia, Sinitsyn Maxim (*Irkutsk State Agricultural University, Molodezhny*)
6. Monitoring data on agricultural production for simulation of management decisions / Ivanyo Yaroslav, Bendik Nadezhda, **Zamaraev Aleksey** (*Irkutsk State Agricultural University, Molodezhny*)
7. Problems of digital twins in occupational medicine / **Dyakovich Marina** (*Angarsk State Technical University, Angarsk*)
8. Risk management during research in a medical laboratory / **Kuz'menko Vladimir**¹, Gornov Alexander²

¹*Irkutsk State Medical Academy of Postgraduate Education of MOH Russia*

²*Matrosov Institute for System Dynamics and Control Theory SB RAS, Irkutsk*

BAIKAL HOVERCRAFT TRIP

DIGITALIZATION AND MEDICINE: RELATIONSHIPS AND CHALLENGES

Moderator: Dyakovich Marina

March 18, 10:00

Monday

SESSION 4

1. Smart Digital Twins as a trend of energy systems intelligentization in Russia / **Massel Aleksei**, Massel Lyudmila (*Melentiev Energy Systems Institute SB RAS, Irkutsk*)
2. Methods of building digital twins of renewable energy sources based on ontology engineering / Massel Liudmila, Massel Aleksei, **Shchukin Nikita** (*Melentiev Energy Systems Institute SB RAS, Irkutsk*)
3. Applying an agent-service approach in the development of a digital twin / **Tsybikov Aleksei** (*Melentiev Energy Systems Institute SB RAS, Irkutsk*)
4. Designing an event-based model of agent interaction for digital twin of an isolated energy system / **Gaskova Daria**, Massel Aleksei (*Melentiev Energy Systems Institute SB RAS, Irkutsk*)
5. Software INTEK-A as the core of a Smart Digital Twin of the fuel and energy complex / Massel Lyudmila, Massel Aleksei, **Mamedov Timur** (*Melentiev Energy Systems Institute SB RAS, Irkutsk*)
6. Information and computational system WICS: current state and development plans / **Kuzmin Vladimir** (*Melentiev Energy Systems Institute SB RAS, Irkutsk*)
7. Information system to support publishing activities / **Popova Maria** (*Melentiev Energy Systems Institute SB RAS, Irkutsk*)

March 18, 14:00

Monday

BAIKAL HOVERCRAFT TRIP

March 18, 17:00

Round Table

Monday

DIGITAL TWINS OF SCIENTIFIC FACILITIES OF MEGASCIENCE CLASS

Moderators: Marchenko Mikhail, Massel Liudmila

SESSION 5

1. Knowledge Ecosystem as a new approach to knowledge management / **Massel Liudmila** (*Melentiev Energy Systems Institute of SB RAS, Irkutsk*)
2. Applications of artificial intelligence techniques in energy: a scientometric review / **Mikheev Aleksei** (*Melentiev Energy Systems Institute SB RAS, Irkutsk*)
3. The use of the semantic approach to aid conceptual representation of mathematical models / **Galperova Elena**, Vorozhtsova Tatiana (*Melentiev Energy Systems Institute SB RAS, Irkutsk*)
4. Integration technique for energy and environmental systems resilience studies / **Pesterev Dmitrii** (*Melentiev Energy Systems Institute SB RAS, Irkutsk*)
5. Approaches to analysing the flows of science and technology knowledge and their applications in energy / **Karimov Nikolai**, Mikheev Aleksei (*Melentiev Energy Systems Institute SB RAS, Irkutsk*)
6. Dynamic cognitive modelling as a tool for analysing development factors in energy / **Kozlov Maksim**^{1,2}, Mikheev Aleksei¹
¹*Melentiev Energy Systems Institute SB RAS, Irkutsk*
²*Irkutsk National Research Technical University, Irkutsk*
7. Knowledge maps as a component of the Knowledge Ecosystem / **Lezin Aleksander**, Massel Liudmila (*Melentiev Energy Systems Institute of SB RAS, Irkutsk*)

KNOWLEDGE ECOSYSTEMS

Moderators: Massel Liudmila, Mikheev Aleksei

Experience in building neuroassistants for a knowledge ecosystem / **Melnikov Andrey** (*Yugra research Institute of information technologies, Khanty-Mansiysk*)

Knowledge graph of the subject area of a thematic journal / **Tuchkova Natalia**, Serebryakov Vladimir, Ataeva Olga (*Institution of Russian Academy of Sciences Dorodnicyn Computing Centre of RAS, Moscow*)

FINAL DISCUSSION