

16th International Symposium on Neural Networks

ISNN2019 Final Program



Sponsors/Organizers :

Skoltech

Skolkovo Institute of Science and Technology

Skolkovo Institute of Science and Technology



City University of Hong Kong

Technical co-sponsors:



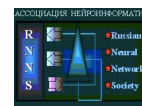
International Neural Network Society

APNNSociety

Asian Pacific Neural Network Society



Polish Neural Networks Society



Russian Neural Network Society

Welcome Messages

On behalf of the Organizing Committee of the 16th International Symposium on Neural Networks (ISNN2019), we welcome you to attend this event taking place in Moscow, Russia during July 10-12, 2019. Thanks to the success of the previous events, ISNN has become a well-established series of popular and high-quality conferences on the theory and methodology of neural networks and their applications. ISNN 2019 aimed to provide a high-level international forum for scientists, engineers, and educators to present the state of the art of neural network research and applications in related fields. The symposium also featured plenary speeches given by world renowned scholars, regular sessions with a broad coverage, and special sessions focusing on popular topics.

This year, the symposium received more submissions than previous years. Each submission was reviewed by at least two, and on average, 4.5 Program Committee members. After the rigorous peer reviews, the committee decided to accept 111 papers for publication in the Lecture Notes in Computer Science (LNCS) proceedings. These papers cover many topics of neural network-related research including learning system, graph model, adversarial learning, time series analysis, dynamic prediction, uncertain estimation, model optimization, clustering, game theory, stability analysis, control method, industrial application, image recognition, scene understanding, biomedical engineering, hardware. In addition to the contributed papers, the ISNN 2019 technical program included three keynote and plenary speeches by renowned scholars: Prof. Andrzej Cichocki (IEEE Fellow, Skolkovo Institute of Science and Technology, Moscow, Russia), Prof. Yaochu Jin (IEEE Fellow, University of Surrey, Guildford, UK), and Prof. Nikhil R. Pal (IEEE Fellow, Indian Statistical Institute, Calcutta, India).

Many organizations and volunteers made great contributions toward the success of this symposium. We would like to express our sincere gratitude to Skolkovo Institute of Science and Technology and City University of Hong Kong for their sponsorship, the International Neural Network Society, Asian Pacific Neural Network Society, Polish Neural Network Society, and Russian Neural Network Society for their technical co-sponsorship. We would also like to sincerely thank all the committee members for their great efforts in organizing the symposium. Special thanks to the Program Committee members and reviewers whose insightful reviews and timely feedback ensured the high quality of the accepted papers and the smooth flow of the symposium. We would also like to thank Springer for their cooperation in publishing the proceedings in the prestigious LNCS series. Finally, we would like to thank all the speakers, authors, and participants for their support.

Evgeny Burnaev, Ivan Oseledets, Jun Wang

Huchuan Lu, Huajin Tang, Zhanshan Wang

Organization

General Chairs

Evgeny Burnaev	Skolkovo Institute of Science and Technology, Moscow, Russia
Ivan Oseledets	Skolkovo Institute of Science and Technology, Moscow, Russia

Advisory Chairs

Andrzej Cichocki	Skolkovo Institute of Science and Technology, Moscow, Russia
Witali L. Dunin-Barkowski	Moscow Institute of Physics and Technology, Moscow, Russia
Irwin King	The Chinese University of Hong Kong, Hong Kong
Derong Liu	University of Illinois - Chicago, Chicago, USA
Boris V. Kryzhanovsky	Scientific Research Institute for System Analysis, Russian Academy of Sciences, Moscow, Russia
Leszek Rutkowski	Technical University of Czestochowa, Czestochowa, Poland

Steering Chairs

Haibo He	University of Rhode Island, Kingston, USA
Jun Wang	City University of Hong Kong, Hong Kong

Organizing Chair

Jun Wang	City University of Hong Kong, Hong Kong
----------	---

Program Chairs

Huchuan Lu	Dalian University of Technology, Dalian, China
Huajin Tang	Sichuan University, Chengdu, China
Zhanshan Wang	Northeastern University, Shenyang, China

Special Sessions Chairs

Fengyu Cong	Dalian University of Technology, Dalian, China
Nian Zhang	University of District of Columbia, Washington, USA
Dongbin Zhao	Institute of Automation, Chinese Academy of Sciences, Beijing, China

Publicity Chairs

Min Han	Dalian University of Technology, Dalian, China
Tingwen Huang	Texas A&M University - Qatar, Qatar
Xiaofeng Liao	Chongqing University, Chongqing, China
Zhigang Zeng	Huazhong University of Science and Technology, Wuhan, China
Jun Zhang	South China University of Technology, Guangzhou, China

Publications Chairs

Jin Hu	Chongqing Jiaotong University, Chongqing, China
Xinyi Le	Shanghai Jiao Tong University, Shanghai, China
Sitian Qin	Harbin Institute of Technology – Weihai, Weihai, China
Meiling Xu	Dalian University of Technology, Dalian, China

Registration Chairs

Shenshen Gu	Shanghai University, Shanghai, China
Ka Chun Wong	City University of Hong Kong, Hong Kong

Local Arrangements Chairs

Maxim Kuznetsov	Skolkovo Institute of Science and Technology, Moscow, Russia
Ekaterina Loginova	Skolkovo Institute of Science and Technology, Moscow, Russia

Program Committee

Ping An	Sabri Arik	Xiaochun Cao	Wenliang Chen
Long Cheng	Zheru Chi	Yang Cong	Jose A. F. Costa
Ruxandra Costea	Chaoran Cui	Cheng Deng	Lei Deng
Jing Dong	Minghui Dong	Jianchao Fan	Xin Fan
Liang Feng	Wai-Keung Fung	Shenghua Gao	Shiming Ge
Tianyu Geng	Xin Geng	Xiaofeng Gong	Jie Gui
Chengan Guo	Ping Guo	Zhenhua Guo	Zhenyuan Guo
Zhishan Guo	Huiguang He	Ran He	Jin Hu
Jinglu Hu	Xiaolin Hu	Bonan Huang	Wei Jia
Muwei Jian	Danchi Jiang	Min Jiang	Shunshoku Kanae
Sungshin Kim	Wanzeng Kong	Chiman Kwan	Man Lan
Xinyi Le	Chuangdong Li	Guoqi Li	Michael Li
Tianrui Li	Qihua Lin	Xiangbo Lin	Jian Liu
Ju Liu	Lei Liu	Qingshan Liu	Zhenwei Liu
Huchuan Lu	Wenlian Lu	Yanhong Luo	Yunpeng Pan
Yaxin Peng	Zhouhua Peng	Yu Qi	Sitian Qin
Qinru Qiu	Hong Qu	Pengju Ren	Sergey Sukhov
Norikazu Takahashi	Huajin Tang	Qing Tao	Feng Wan
Lidan Wang	Zhanshan Wang	Qinglai Wei	Huaqiang Wu
Yong Xia	Xiurui Xie	Shaofu Yang	Mao Ye
Qiang Yu	Shan Yu	Wen Yu	Wenwu Yu
Zhaofei Yu	Zhi-Hui Zhan	Jie Zhang	Malu Zhang
Nian Zhang	Tielin Zhang	Xiaoting Zhang	Xuetao Zhang
Yongqing Zhang	Zhaoxiang Zhang	Wenda Zhao	Chengqing Zong

Program at a Glance

July 11, 2019 (Thursday) , Hypercube				
8:30-17:30	On-site Registration (1st floor)			
9:00-9:10	Opening ceremony (4th floor)			
9:10-10:00	Plenary speech, Prof. Nikhil R. Pal (4th floor)			
10:00-10:20	Coffee break (1st floor)			
10:20-11:10	Plenary speech, Prof. Andrzej Cichocki (4th floor)			
11:10-12:00	Plenary speech, Prof. Yaochu Jin (4th floor)			
12:00-13:00	Lunch (1st floor)			
13:00-17:20	Oral Sessions			
13:00-15:00	2nd floor	3rd floor	4th floor	7th floor
	Oral Session 1 Learning Systems I	Oral Session 2 Prediction and Estimation I	Oral Session 3 Intelligent Control I	Oral Session 4 Pattern Recognition I
15:00-15:20	Coffee break (1st floor)			
15:20-17:20	Oral Session 5 Learning Systems II	Oral Session 6 Prediction and Estimation II	Oral Session 7 Intelligent Control II	Oral Session 8 Applications I
18:00-20:00	Banquet (1st floor)			
July 12, 2019 (Friday)				
9:00-12:00	Oral Sessions			
9:00-10:20	2nd floor	3rd floor	4th floor	7th floor
	Oral Session 9: Model Analysis I	Oral Session 10: Optimization	Oral Session 11: Signal Processing	Oral Session 12: Pattern Recognition II
10:20-10:40	Coffee break (1st floor)			
10:40-12:00	Oral Session 13: Model Analysis II	Oral Session 14: Learning Systems III	Oral Session 15: Biomedical Engineering	Oral Session 16: Applications II
12:00-13:00	Lunch (1st floor)			
13:00-17:00	Poster Session (1st floor)			

Plenary Speech I

Title: Can We Make My Neural Network a Little More Comprehensible and Biologically Plausible?

Professor Nikhil R Pal, Indian Statistical Institute, Calcutta, India

President of IEEE Computational Intelligence Society

Fellow of IEEE, National Academy of Sciences in India, Indian National Academy of Engineering, Indian National Science Academy, International Fuzzy Systems Association (IFSA), and The World Academy of Sciences

Abstract: In the recent past there have been several success stories of AI systems, often beating human performance. In many cases, neural networks, in particular deep neural networks, are the main pillars of such systems. But are these systems comprehensible and/or biologically plausible? In most cases, they are not! In my view, comprehensibility of a system depends, at least, on the following: simplicity, transparency, explainability, trustworthiness, and the biological plausibility of such systems. Ideally, we should strive for realizing all these attributes in any intelligent system, but this is very difficult. So I shall follow an easier path to describe how these attributes may be realized separately. I shall illustrate each case with examples.



Nikhil R. Pal is a Professor in the Electronics and Communication Sciences Unit of the Indian Statistical Institute. His current research interest includes brain science, computational intelligence, machine learning and data mining. He was the Editor-in-Chief of the *IEEE Transactions on Fuzzy Systems* for the period January 2005-December 2010. He has served/been serving on the editorial /advisory board/ steering committee of several journals including the *International Journal of Approximate Reasoning*, *Applied Soft Computing*, *International Journal of Neural Systems*, *Fuzzy Sets and Systems*, *IEEE Transactions on Fuzzy Systems* and the *IEEE Transactions on Cybernetics*. He is a recipient of the 2015 IEEE Computational Intelligence Society (CIS) Fuzzy Systems Pioneer Award, He has given many plenary/keynote speeches in different premier international conferences in the area of computational intelligence. He has served as the General Chair, Program Chair, and co-Program chair of several conferences. He is a Distinguished Lecturer of the IEEE CIS (2010-2012, 2016-2018.) and was a member of the Administrative Committee of the IEEE CIS (2010-2012). He has served as the Vice-President for Publications of the IEEE CIS (2013-2016). He is serving as the President of the IEEE CIS (2018-2019). He is a Fellow of the National Academy of Sciences, India, Indian National Academy of Engineering, Indian National Science Academy, International Fuzzy Systems Association (IFSA), The World Academy of Sciences, and a Fellow of the IEEE, USA. (www.isical.ac.in/~nikhil)

Plenary Speech II

Title: Tensor Networks and Their Applications in Deep Learning and Machine Learning

Professor Andrzej Cichocki, IEEE Fellow

Skolkovo Institute of Science and Technology (SKOLTECH), Moscow, Russia

Abstract: Tensor decomposition (TD) and their generalizations tensor networks (TNs) are emerging tools in Machine Learning (ML), Big Data Analysis (BDA) and Deep Neural Networks (DNN). Many real-life data can be naturally represented as higher-order tensors, which can be described in distributed and compressed forms by tensor decomposition, with substantially, reduced the number of parameters.

We will present a brief overview of tensor networks architectures, associated efficient learning algorithms, and illustrate their perspective and potential applications. We graphically illustrate models of Tensor Train, Tensor Ring and Hierarchic Tucker, MERA and describe their properties and other promising tensor network decomposition for high order tensors. Particular emphasis will be given to tensor completion, feature extraction, classification, clustering, and anomaly detection problems in computational neuro-science, especially brain computer interface. Generalization of PCA, SVD, CCA, PLS, SVM and regression for tensor models will be also discussed.



Andrzej Cichocki received the M.Sc. (with honors), Ph.D. and Dr.Sc. (Habilitation) degrees, all in electrical engineering from Warsaw University of Technology (Poland). He spent several years at the University of Erlangen (Germany) as an Alexander-von-Humboldt Research Fellow and Guest Professor. He was a Senior Team Leader and Head of the laboratory for Advanced Brain Signal Processing, at RIKEN

Brain Science Institute (Japan) and now he is a Professor in the Skolkovo Institute of Science and Technology - SKOLTECH. He is author of more than 500 technical journal papers and 5 monographs in English (two of them translated to Chinese). He served as Associated Editor of *IEEE Trans. on Signals Processing*, *IEEE Trans. on Neural Networks and Learning Systems*, *IEEE Trans on Cybernetics*, *Journal of Neuroscience Methods* and he is founding Editor in Chief of *Journal Computational Intelligence and Neuroscience*. Currently, his research focus on brain computer interface, multiway blind source separation, tensor decomposition and tensor networks for biomedical applications. His publications currently report over 39,000 citations according to Google Scholar, with an h-index of 88. He is Fellow of the IEEE since 2013.

Plenary Speech III

Title: Evolutionary Multi-objective Federated Learning

Professor Yaochu Jin, University of Surrey, Guilford, UK

IEEE Fellow, Editor-in-Chief of the *IEEE Transactions on Cognitive and Developmental Systems*

Abstract: Federated learning is a new distributed machine learning paradigm for privacy preserving. This talk starts with an introduction to privacy-preserving machine learning, including federated learning, oblivious learning and learning over encrypted data. This is followed by an overview of multi-objective machine learning and neural architecture search in deep learning. On the basis of the above discussions, we present an evolutionary multi-objective federated learning algorithms for communication-efficient federated learning. The talk is concluded with an outline of future work in federated learning.



Yaochu Jin received the B.Sc., M.Sc., and Ph.D. degrees from Zhejiang University, Hangzhou, China, in 1988, 1991, and 1996, respectively, and the Dr.-Ing. degree from Ruhr University Bochum, Germany, in 2001. He is currently a Distinguished Chair Professor in Computational Intelligence, Department of Computer Science, University of Surrey, Guildford, U.K., where he heads the Nature Inspired Computing and Engineering Group. He was a Finland Distinguished Professor and a Changjiang

Distinguished Visiting Professor, China. His main research interests include data-driven surrogate-assisted evolutionary optimization, evolutionary learning, interpretable and secure machine learning, and evolutionary developmental systems. His research has been funded by EU, EPSRC, Royal Society, NSFC, and the industry, including Honda, Airbus, and Bosch. He was elevated to IEEE Fellow for his contributions to evolutionary optimization. Dr Jin is the Editor-in-Chief of the *IEEE Transactions on Cognitive and Developmental Systems* and Co-Editor-in-Chief of *Complex & Intelligent Systems*. He is an IEEE Distinguished Lecturer (2013-2015 and 2017-2019) and past Vice President for Technical Activities of the IEEE Computational Intelligence Society (2014-2015). He is the recipient of the 2018 IEEE Transactions on Evolutionary Computation Outstanding Paper Award, the 2015 and 2017 IEEE Computational Intelligence Magazine Outstanding Paper Award, and the Best Paper Award of the 2010 IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology.

July 11, 2019

On-site Registration

8:30-17:30, 1st Floor, Hypercube

Opening Ceremony

9:00-9:10, 4th Floor, Hypercube

Plenary Sessions

9:10-10:00, Plenary Talk I, Chair: Evgeny Burnaev

Prof. Nikhil R. Pal, IEEE Fellow, President of IEEE Computational Intelligence Society, Indian Statistical Institute, Calcutta, India

Title: *Can We Make My Neural Network a Little More Comprehensible and Biologically Plausible?*

10:00-10:20, Coffee break, 1st Floor

10:20-11:10, Plenary Talk II, Chair: Yiu-Ming Cheung

Prof. Andrzej Cichocki, IEEE Fellow, Skolkovo Institute of Science and Technology, Moscow, Russia

Title: *Tensor Networks and Their Applications in Deep Learning and Machine Learning*

11:10-12:00, Plenary Talk III, Chair: Dongbin Zhao

Prof. Yaochu Jin, IEEE Fellow, Editor-in-Chief of *IEEE Transactions on Cognitive and Development Systems*, University of Surrey, Guildford, United Kingdom

Title: *Evolutionary Multi-objective Federated Learning*

12:00-13:00, Lunch, 1st Floor

Oral Session 1: Learning Systems I

13:00-15:00, 2nd Floor

Chair: Wen Yu, Co-Chair: Jian Wang

- 13:00 Yan Zhou, Yaochu Jin, and Jinliang Ding. Evolutionary Optimization of Liquid State Machines for Robust Learning
- 13:20 Wen Yu, Xiaou Li, and Jesus Gonzalez. Fast Training of Deep LSTM Networks
- 13:40 Tatiana T. Kaverzneva, Galina F. Malykhina, and Dmitriy A. Tarkhov. From Differential Equations to Multilayer Neural Network Models
- 14:00 Isaac Chairez, Alexander Poznyak, Alexander Nazin, and Tatyana Poznyak. Projectional Learning Laws for Differential Neural Networks Based on Double-Averaged Sub-Gradient Descent Technique
- 14:20 Ling Yu, Zhen Zhang, Xuetao Xie, Hua Chen, and Jian Wang. Unsupervised Feature Selection Using RBF Autoencoder
- 14:40 Xingjian Chen, Jianbo Su, and Jun Zhang. A Two-Teacher Framework for Knowledge Distillation

Oral Session 2: Prediction and Estimation I

13:00-15:00, 3rd Floor

Chair: Mikhail S. Tarkov, Co-Chair: Wenwu Yu

- 13:00 Yonghong Tan, Ruili Dong, and Hong He. Neural Network Based Modeling of Hysteresis in Smart Material Based Sensors
- 13:20 Ping Jiang, Jiejie Chen, and Zhigang Zeng. Multi Step Prediction of Landslide Displacement Time Series Based on Extended Kalman Filter and Back Propagation Trough Time
- 13:40 Mikhail S. Tarkov. Noise Filtering in Cellular Neural Networks
- 14:00 Xiaochen Lai, Xia Wu, Liyong Zhang, and Genglin Zhang. Imputation Using a Correlation-Enhanced Auto-Associative Neural Network with Dynamic Processing of Missing Values
- 14:20 Di Liu, Wenwu Yu, and Simone Baldi. Broad Learning for Optimal Short-Term Traffic Flow Prediction
- 14:40 Lihua Zhou, Minrui Fei, Dajun Du, Wenting Li, Huosheng Hu, and Aleksandar Rakić. A Novel QGA-UKF Algorithm for Dynamic State Estimation of Power System

Oral Session 3: Intelligent Control I

13:00-15:00, 4th Floor

Chair: Zhouhua Peng, Co-Chair: Jiejie Chen

- 13:00 Bo Dong, Tianjiao An, Fan Zhou, Shenquan Wang, Yulian Jiang, Keping Liu, Fu Liu, Huiqiu Lu, and Yuanchun Li. Decentralized Robust Optimal Control for Modular Robot Manipulators Based on Zero-Sum Game with ADP
- 13:20 Yaqi Wang, Jianquan Lu, Jinling Liang, and Jinde Cao. Leader-Following Consensus of Nonlinear Multi-agent System via a Distributed ET Impulsive Control Strategy
- 13:40 Shimin Wang and Jie Huang. Adaptive Distributed Observer for an Uncertain Leader over Directed Acyclic Graphs
- 14:00 Boshan Chen, Jiejie Chen, Zhigang Zeng, and Ping Jiang. A Novel Second-Order Consensus Control in Multi-agent Dynamical Systems
- 14:20 Shengnan Gao, Lu Liu, Zhouhua Peng, Dan Wang, Nan Gu, and Yue Jiang. An Asymptotically Stable Identifier Design for Unmanned Surface Vehicles Based on Neural Networks and Robust Integral Sign of the Error
- 14:40 Jiasen Wang, Jun Wang, and Shenshen Gu. Neurodynamics-Based Receding Horizon Control of an HVAC System

Oral Session 4: Pattern Recognition I

13:00-15:00, 7th Floor

Chair: Qingshan Liu; Co-Chair: Shaofu Yang

- 13:00 Qingshan Liu, Jiang Xiong, and Shaofu Yang. Mixed-Norm Projection-Based Iterative Algorithm for Face Recognition
- 13:20 Lan Wang, Jianbo Su, and Kejun Zhang. Cross-Database Facial Expression Recognition with Domain Alignment and Compact Feature Learning
- 13:40 Zeyang Song, Xi Wu, Mengwen Yuan, and Huajin Tang. An Unsupervised Spiking Deep Neural Network for Object Recognition
- 14:00 Maria Kolos, Anton Marin, Alexey Artemov, and Evgeny Burnaev. Procedural Synthesis of Remote Sensing Images for Robust Change Detection with Neural Network
- 14:20 Alexey Bokhovkin and Evgeny Burnaev. Boundary Loss for Remote Sensing Imagery Semantic Segmentation

14:40 Mingxian Nie, Jinjie Zhang, and Xuetao Zhang. Ship Segmentation and Orientation Estimation Using Keypoints Detection and Voting Mechanism in Remote Sensing Images

15:00-15:20, Coffee break

Oral Session 5: Learning Systems II

15:20-17:20, 2nd Floor

Chair: Xiaodong Gu, Co-Chair: Dongbin Zhao

15:20 Yuriy Fedorenko, Valeriy Chernenkiy, and Yuriy Gapanyuk. The Neural Network for Online Learning Task without Manual Feature Extraction

15:40 Zhe Qiu and Xiaodong Gu. Graph Convolution and Self Attention Based Non-maximum Suppression

16:00 Yi Lu, Yaran Chen, Dongbin Zhao, and Jianxin Chen. Graph-FCN for Image Semantic Segmentation

16:20 Yaoman Li and Irwin King. Architecture Search for Image Inpainting

16:40 Yun Luo, Li-Zhen Zhu, and Bao-Liang Lu. A GAN-Based Data Augmentation Method for Multimodal Emotion Recognition

17:00 Shuailong Lian, Hejian Zhou, and Yi Sun. FG-SRGAN: A Feature-Guided Super-Resolution Generative Adversarial Network for Unpaired Image Super-Resolution

Oral Session 6: Prediction and Estimation II

15:20-17:20, 3rd Floor

Chair: Zhanshan Wang, Co-Chair: Anton Agafonov

15:20 Anton Agafonov and Alexander Yumaganov. Bus Arrival Time Prediction with LSTM Neural Network

15:40 Andrei Atanov, Arsenii Ashukha, Dmitry Molchanov, Kirill Neklyudov, and Dmitry Vetrov. Uncertainty Estimation via Stochastic Batch Normalization

16:00 Andrey V. Savchenko and Alexandr G. Rassadin. Scene Recognition in User Preference Prediction Based on Classification of Deep Embeddings and Object Detection

- 16:20 Guoqiang Tan, Jidong Wang, Zhanshan Wang, and Xiaolong Qian. An Improved Result on H1 Performance State Estimation of Delayed Static Neural Networks
- 16:40 Chunliang Gou, Xing He, and Junjian Huang. A Hybrid Neurodynamic Algorithm to Multi-objective Operation Management in Microgrid

Oral Session 7: Intelligent Control II

15:20-17:20, 4th Floor

Chair: Zhouhua Peng, Co-Chair: Shenshen Gu

- 15:20 Chengcheng Meng, Lu Liu, Zhouhua Peng, Dan Wang, Haoliang Wang, and Gang Sun. Neural-Network-Based Modular Dynamic Surface Control for Surge Speed Tracking of an Unmanned Surface Vehicle Driven by a DC Motor
- 15:40 Yue Jiang, Lu Liu, Zhouhua Peng, Dan Wang, Nan Gu, and Shengnan Gao. Intelligent Fuzzy Kinetic Control for an Under-Actuated Autonomous Surface Vehicle via Stochastic Gradient Descent
- 16:00 Bing Li, Fan Zhou, Bo Dong, Yucheng Liu, Fu Liu, Huiqiu Lu, and Yuanchun Li. Active Optimal Fault-Tolerant Control Method for Multi-fault Concurrent Modular Manipulator Based on Adaptive Dynamic Programming
- 16:20 Yifei Li and Zunhua Guo. An Adaptive Chirplet Filter for Range Profiles Automatic Target Recognition

Oral Session 8: Applications I

15:20-17:20, 7th Floor

Chair: Evgeny Burnaev, Co-Chair: Yu Zheng

- 15:20 Oleg Sudakov, Dmitri Koroteev, Boris Belozarov, and Evgeny Burnaev. Artificial Neural Network Surrogate Modeling of Oil Reservoir: A Case Study
- 15:40 Xu Yang, Shuangming Yu, Liyuan Liu, Jian Liu, and Nanjian Wu. Efficient Reservoir Encoding Method for Near-Sensor Classification with Rate-Coding Based Spiking Convolutional Neural Networks
- 16:00 Zhe Chen, Yiyao Zhang, Hailei Gong, Xinyi Le, and Yu Zheng. Fault Diagnosis of Gas Turbine Fuel Systems Based on Improved SOM Neural

Network

- 16:20 Bolanle Tolulope Abe and Jaco Jordaan. Separability Method for Homogeneous Leaves Using Spectroscopic Imagery and Machine Learning Algorithms
- 16:40 Dmitry Smolyakov, Nadezda Sviridenko, Vladislav Ishimtsev, Evgeny Burikov, and Evgeny Burnaev. Learning Ensembles of Anomaly Detectors on Synthetic Data
- 17:00 Anton Yakovenko, Aleksandr Antropov, and Galina Malykhina. Blind Noise Reduction for Speech Enhancement by Simulated Auditory Nerve Representations

18:00-21:00, Banquet, 1st Floor

July 12, 2019

Oral Session 9: Model Analysis I

9:00-10:20, 2nd Floor

Chair: Evgeny Burnaev

- 9:00 Evgenii Egorov, Kirill Neklydov, Ruslan Kostoev, and Evgeny Burnaev. MaxEntropy Pursuit Variational Inference
- 9:20 Katsiaryna Krasnashchok and Aymen Cherif. Coherence Regularization for Neural Topic Models
- 9:40 Manish Aggarwal and Madasu Hanmandlu. Moderated Information Sets
- 10:00 Jia-Xing Yang, Xiao-Feng Gong, and Gui-Chen Yu. An Algebraic Algorithm for Joint Independent Subspace Analysis

Oral Session 10: Optimization

9:00-10:20, 3th Floor

Chair: Wei-Neng Chen, Co-Chair: Zhi-Hui Zhan

- 9:00 Ninglei Fan, Yuping Wang, Junhua Liu, and Yiu-ming Cheung. A New Adaptive Hybrid Algorithm for Large-Scale Global Optimization
- 9:20 Hong Zhao, Zhi-Hui Zhan, Wei-Neng Chen, Xiao-Nan Luo, Tian-Long Gu, Ren-Chu Guan, Lan Huang, and Jun Zhang. An Improved Selection Operator

for Multi-objective Optimization

- 9:40 Xinrui Jiang, Sitian Qin, and Ping Guo. A Gradient-Descent Neurodynamic Approach for Distributed Linear Programming
- 10:00 Man-Fai Leung and Jun Wang. A Collaborative Neurodynamic Optimization Approach to Bicriteria Portfolio Selection

Oral Session 11: Signal Processing

9:00-10:20, 4th Floor

Chair: Qiu-Hua Lin, Co-Chair: Hangjun Che

- 9:00 Hangjun Che, Jun Wang, and Wei Zhang. A Collaborative Neurodynamic Approach to Sparse Coding
- 9:20 Jin-Wei Yang, Xiao-Feng Gong, Lu-Ming Wang, and Qiu-Hua Lin. Canonical Polyadic Decomposition with Constant Modulus Constraint: Application to Polarization Sensitive Array Processing
- 9:40 Gui-Chen Yu, Xiao-Feng Gong, Jia-Cheng Jiang, Zhi-Wen Liu, and You-Gen Xu. Wideband Direction Finding via Spatial Decimation and Coupled Canonical Polyadic Decomposition
- 10:00 Jia-Xing Yang, Xiao-Feng Gong, Hui Li, You-Gen Xu, and Zhi-Wen Liu. Using Coupled Multilinear Rank-(L, L, 1) Block Term Decomposition in Multi-Static-Multi-Pulse MIMO Radar to Localize Targets

Oral Session 12: Pattern Recognition II

9:00-10:20, 7th Floor

Chair: Chengan Guo, Co-Chair: Qiu-Hua Lin

- 9:00 Bin Sun, Guo-Zhong Li, Min Han, and Qiu-Hua Lin. A Deep Learning Approach to Detecting Changes in Buildings from Aerial Images
- 9:20 Jing Liu, Jianbin Wang, Changqing Zhang, Xiubo Yang, Jianbo Deng, Ruihe Zhu, Xiaojie Nan, and Qinghua Chen. Chinese Address Similarity Calculation Based on Auto Geological Level Tagging
- 9:40 Bo Xu and Chengan Guo. Robust Object Tracking Based on Deep Feature and Dual Classifier Trained with Hard Samples
- 10:00 Han K. Cao, Duyen T. Ly, Duy M. Nguyen, and Binh T. Nguyen.

Automatically Generate Hymns Using Variational Attention Models

10:20-10:40, Coffee break, 1st Floor

Oral Session 13: Model Analysis II

10:40-12:00, 2nd Floor

Chair: Xinyi Le, Co-Chair: Bo Zhao

- 10:40 Kanghao Du, Ruizhuo Song, Qinglai Wei, and Bo Zhao. A Solution of Two-Person Zero Sum Differential Games with Incomplete State Information
- 11:00 Eduardo C. Simões and Francisco de A. T. de Carvalho. A Fuzzy Clustering Algorithm with Multi-medoids for Multi-view Relational Data
- 11:20 Katleho Moloï, Jaco Jordaan, and Yskandar Hamam. Application of Machine Learning Based Technique for High Impedance Fault Detection in Power Distribution Network
- 11:40 Junhui Mei, Xinyi Le, Xiaoting Zhang, and Charlie C. L. Wang. A Learning-Based Approach for Perceptual Models of Preference

Oral Session 14: Learning Systems III

10:40-12:00, 3rd Floor

Chair: Zaur M. Shibzukhov, Co-Chair: Sergey Sukhov

- 10:40 Zaur M. Shibzukhov. Resistant Neural Network Learning via Resistant Empirical Risk Minimization
- 11:00 Magomed Y. Malsagov, Iakov M. Karandashev, and Boris V. Kryzhanovsky. Approximation of Edwards-Anderson Spin-Glass Model Density of States
- 11:20 Mikhail Leontev, Alexander Mikheev, Kirill Sviatov, and Sergey Sukhov. Overcoming Catastrophic Interference with Bayesian Learning and Stochastic Langevin Dynamics
- 11:40 Seyed Jalaleddin Mousavirad, Azam Asilian Bidgoli, Hossein Ebrahimpour-Komleh, Gerald Schaefer, and Iakov Korovin. An Effective Hybrid Approach for Optimising the Learning Process of Multi-layer Neural Networks

Oral Session 15: Biomedical Engineering

10:40-12:00, 4th Floor

Chair: Jianting Cao, Co-Chair: Qiu-Hua Lin

- 10:40 Marina Belyanova, Sergey Chernobrovkin, Igor Latkin, and Roman Samarev. Comparison of Convolutional Neural Networks and Search Based Approaches for Extracting Psychological Characteristics from Job Description
- 11:00 Qipeng Chen, Longhao Yuan, Yao Miao, Qibin Zhao, Toshihisa Tanaka, and Jianting Cao. Quasi-Brain-Death EEG Diagnosis Based on Tensor Train Decomposition
- 11:20 Yue Qiu, Qiu-Hua Lin, Li-Dan Kuang, Wen-Da Zhao, Xiao-Feng Gong, Fengyu Cong, and Vince D. Calhoun. Classification of Schizophrenia Patients and Healthy Controls Using ICA of Complex-Valued fMRI Data and Convolutional Neural Networks

Oral Session 16: Applications II

10:40-12:00, 7th Floor

Chair: Jesús Silva, Co-Chair: Noel Varela

- 10:40 Jesús Silva, Lissette Hernández, Noel Varela, Omar Bonerge Pineda Lezama, Jorge Tafur Cabrera, Bellanith Ruth Lucena León Castro, Osman Redondo Bilbao, and Leidy Pérez Coronel. Intelligent and Distributed Data Warehouse for Student's Academic Performance Analysis
- 11:00 Jesús Silva, Noel Varela, Omar Bonerge Pineda Lezama, Hugo Hernández-P, Jairo Martínez Ventura, Boris de la Hoz, and Leidy Pérez Coronel. Multi-dimension Tensor Factorization Collaborative Filtering Recommendation for Academic Profiles
- 11:20 Jesús Silva, Noel Varela, Omar Bonerge Pineda Lezama, David Martínez Sierra, Jainer Enrique Molina Romero, John Anderson Virviescas Peña, and Rubén Dario Munera Ramirez. The Goal Programming as a Tool for Measuring the Sustainability of Agricultural Production Chains of Rice
- 11:40 Jesús Silva, Noel Varela, Hugo Martínez Caraballo, Jesús García Guilianny, Luis Cabas Vásquez, Jorge Navarro Beltrán, and Nadia León Castro. An Early Warning Method for Basic Commodities Price Based on Artificial Neural Networks

12:00-14:00, Lunch, 1st Floor

Poster Session, 14:00-18:00

1. Xu Jiang and Xiaohong Ma. Dynamic Graph CNN with Attention Module for 3D Hand Pose Estimation
2. Chunyan Lu, Shukai Duan, and Lidan Wang. An Improved Capsule Network Based on Newly Reconstructed Network and the Method of Sharing Parameters
3. Bixiao Meng, Baomin XU, Erjing Zhou, Shuangyuan YU, and Hongfeng Yin. Bidirectional Gated Recurrent Unit Networks for Relation Classification with Multiple Attentions and Semantic Information
4. Vasily Osipov and Viktor Nikiforov. Functional and Structural Features of Recurrent Neural Networks with Controlled Elements
5. Ryotaro Miura, Lukáš Pichl, and Taisei Kaizoji. Artificial Neural Networks for Realized Volatility Prediction in Cryptocurrency Time Series
6. Rajesh Mangannavar and Gopalakrishnan Srinivasaraghavan. Learning Agents with Prioritization and Parameter Noise in Continuous State and Action Space
7. Rodrigo Rivera-Castro, Ivan Nazarov, Yuke Xiang, Alexander Pletneev, Ivan Maksimov, and Evgeny Burnaev. Demand Forecasting Techniques for Build-to-Order Lean Manufacturing Supply Chains
8. Zhongting Jiang, Dong Wang, Jin Sun, Hengyue Shi, Huijie Shang, and Yuehui Chen. Simulation of a Chaos-Like Irregular Neural Firing Pattern Based on Improved Deterministic Chay Model
9. Tingting Liu, Chuyi Song, and Jingqing Jiang. Robotic Path Planning Based on Improved Ant Colony Algorithm
10. Xin Song, Shizhen Qin, Shaokai Niu, and Yan Wang. ACPJS: An Anti-noise Concept Drift Processing Algorithm Based on JS-divergence
11. Chunying Cheng and Chunhua Bao. A Kernel Fuzzy C-means Clustering Algorithm Based on Firefly Algorithm
12. Yuming Bai, Yifan Liu, Qihe Shan, Tieshan Li, and Yuzhen Lu. Data-Based Approximate Policy Iteration for Optimal Course-Keeping Control of Marine Surface Vessels
13. Gang Sun, Mingxin Wang, and Sheng Wang. Adaptive Backstepping Dynamic Surface Control Design of a Class of Uncertain Non-lower Triangular Nonlinear Systems

14. Yang Li, Yao Guo, Qingfang Meng, Zaiguo Zhang, Peng Wu, and Hanyong Zhang. Analysing Epileptic EEG Signals Based on Improved Transition Network
15. Xiulin Wang, Chi Zhang, Tapani Ristaniemi, and Fengyu Cong. Generalization of Linked Canonical Polyadic Tensor Decomposition for Group Analysis
16. Paul Malla, Will Coburn, Kevin Keegan, and Xiao-Hua Yu. Power System Fault Detection and Classification Using Wavelet Transform and Artificial Neural Networks
17. Shuangyi Xiao, Nankun Mu, and Feng Chen. A New Diffusion Kalman Algorithm Dealing with Missing Data
18. Tao Zheng, Bo Li, and Haobo Rao. Enhancing Feature Representation for Saliency Detection
19. Ram Krishna Pandey and A. G. Ramakrishnan. Improving the Perceptual Quality of Document Images Using Deep Neural Network
20. Jianchao Fan, Xiaoxin Liu, Yuanyuan Hu, and Min Han. PolSAR Marine Aquaculture Detection Based on Nonlocal Stacked Sparse Autoencoder
21. Lei Du, Yuwei Zhang, Qingfang Meng, Hanyong Zhang, and Yang Li. Automatic Seizure Detection Based on a Novel Multi-feature Fusion Method and EMD
22. Tetsuo Ishikawa, Mayumi Toshima, and Ken Mogi. Phenomenology of Visual One-Shot Learning: Affective and Cognitive Components of Insight in Morphed Gradual Change Hidden Figures
23. Hui Jiang, Anjie Zhang, Zaiguo Zhang, Qingfang Meng, and Yang Li. Protein Tertiary Structure Prediction Based on Multiscale Recurrence Quantification Analysis and Horizontal Visibility Graph
24. Chuyi Song, Guixia Liu, Jiazhi Song, and Jingqing Jiang. A Novel Prediction Method of ATP Binding Residues from Protein Primary Sequence.
25. Andrey Yuhnev, Dmitriy Tarkhov, Yakov Gataulin, Yana Ivanova, and Alexander Berkovich. Neural Network Methods of HIFU-Therapy Control by Infrared Thermography and Ultrasound Thermometry
26. Mengzhe Zhou, Lidan Wang, and Shukai Duan. An Improved Memristor-Based Associative Memory Circuit for Full-Function Pavlov Experiment
27. Xue Qin, Tao Xiang, Ying Yang, and Xiaofeng Liao. Pair-Comparing Based Convolutional Neural Network for Blind Image Quality Assessment
28. Kechuan Wu, Xiaoping Wang, and Mian Li. Better Performance of Memristive Convolutional Neural Network Due to Stochastic Memristors

29. Qiang Xiao, Tingwen Huang, and Zhigang Zeng. Global Stabilization for Delayed Fuzzy Inertial Neural Networks
30. Weidong Guan, Dengwei Yan, Lidan Wang, and Shukai Duan. A New Complex Hyper-chaotic System and Chaotic Synchronization of Error Feedback with Disturbance
31. Hui Yang, Shukai Duan, and Lidan Wang. A Novel Memristor-CMOS Hybrid Full-Adder and Its Application
32. Guoqiang Tan, Jidong Wang, Zhanshan Wang, and Xiaolong Qian. An Improved Result on H1 Performance State Estimation of Delayed Static Neural Networks
33. Sebastián Basterrech. Pattern Matching in Sequential Data Using Reservoir Projections
34. Dazi Li, Chengjia Lei, Qibing Jin, and Min Han. Regularization in DQN for Parameter-Varying Control Learning Tasks
35. Wei Wei, Pengfei Xia, Zaiwen Liu, and Min Zuo. Robust Adaptive Resonant Damping Control of Nanopositioning

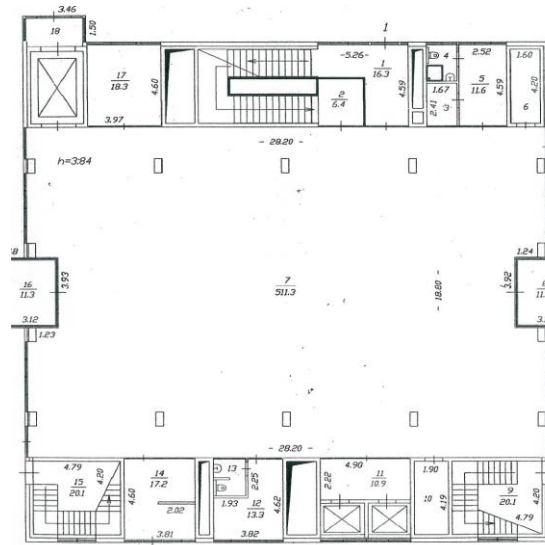
The ISNN2019 venue will be the **Hypercube**, located at the **IC Skolkovo, Malevich st., bld. 1**.

1st floor, max. capacity is 500 persons, 400 sq.m. Registration area + Lunch area.

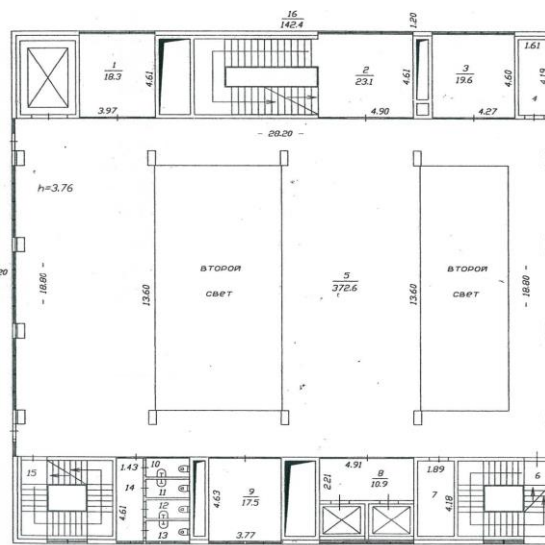
2nd, 3rd, and 7th floors, Meeting Rooms, maximum capacity is 80 persons and 100 sq.m.

4th floor, conference hall, maximum capacity is 300 persons, 520 sq.m.

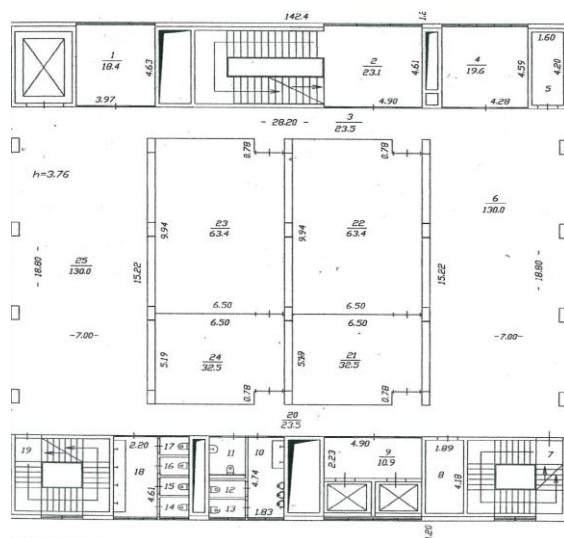
1st Floor



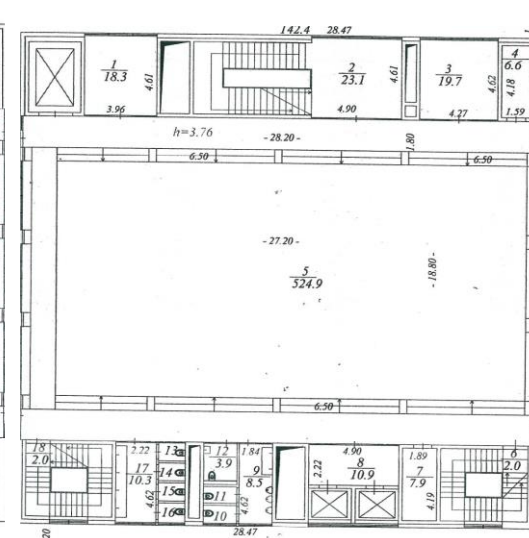
2nd Floor



3rd Floor



4th Floor



Transportation Information

Conference participants can get there by the following ways:

1) From the metro station Slavyansky Boulevard **by the Skolkovo Express**. The bus stop is located on Kutuzov Avenue (The scheme of the location of the bus stop and the timetable are attached). The cost of a bus ticket is 53 rubles. The cost of a ticket to metro is 55 rubles.



Метро **Славянский бульвар** → Парковка **Минская**
 Metro station **Slavyansky Bulvar** → **Minskaya Car Park**

05	06 35 50	07 00 30 10 41 20 53	08 00 30 51 07 37 58 19 44	09 05 26 47 12 33 55 19 40
10 02 20 45 10 30	11 00 30 15 45	12 00 40 20	13 00 40 20	14 00 40 20
15 00 40 20	16 00 50 20	17 05 40 55 20 45 35 50	18 00 20 40 05 30 45 10 35 50	19 00 20 45 05 30 55 10 40
20 05 25 55 15 35 20 45	21 00	22	23	24

By the Skolkovo Express, the participants need to arrive to the station "Technopark".

Next to take the bus № 5 of the internal route (travel on the minibus of the internal routes is free) and get to the “Matryoshka” (Matrix) station, then follow the pointer to the venue of the event.

Estimated travel time is 50 minutes.

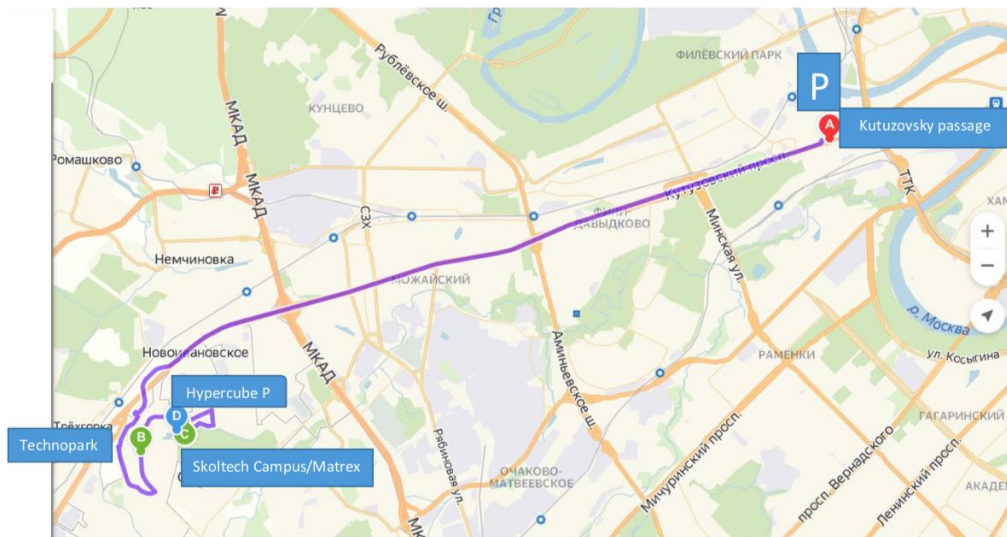
2) From Belorussky railway station **by high-speed train**. The train departs from Belorussky railway station (Belorusskaya metro station) according to the attached schedule. The cost of a train ticket is 138 rubles. Arrival station is "Innovation Center".

Departure from Belorussky railway station	Arrivat to Innovaciionny centr			Route	Ticket Price
06:30 РЭКС ★ (обычно 1 пл. 9 тулик)	06:47 (пл. 2 путь 3)	17 м	по рабочим	Москва Белорусская → Одинцово	138 руб.
07:30 РЭКС ★ (пл. №1 тулик 9)	07:47 (пл. 2 путь 3)	17 м	по рабочим	Москва Белорусская → Одинцово	138 руб.
08:08 РЭКС ★	08:31	23 м	по рабочим	Дмитров → Одинцово	138 руб.
08:30 РЭКС ★ (пл. №1 тулик 9)	08:47 (пл. 2 путь 3)	17 м	по рабочим	Москва Белорусская → Одинцово	138 руб.
09:30 РЭКС ★ (пл. №1 тулик 9)	09:47 (пл. 2 путь 3)	17 м	по рабочим	Москва Белорусская → Одинцово	138 руб.
10:30 РЭКС ★ (пл. №1 тулик 9)	10:47 (пл. 2 путь 3)	17 м	по рабочим	Москва Белорусская → Одинцово	138 руб.
11:30 РЭКС ★ (пл. №1 тулик 9)	11:47 (пл. 2 путь 3)	17 м	по рабочим	Москва Белорусская → Одинцово	138 руб.
12:30 РЭКС ★ (пл. №1 тулик 9)	12:47 (пл. 2 путь 3)	17 м	по рабочим	Москва Белорусская → Одинцово	138 руб.
13:30 РЭКС ★ (пл. №1 тулик 9)	13:47 (пл. 2 путь 3)	17 м	по рабочим	Москва Белорусская → Одинцово	138 руб.
13:45 РЭКС ★	14:07	22 м	по рабочим	Дмитров → Можайск	138 руб.
14:30 РЭКС ★ (пл. №1 тулик 9)	14:47 (пл. 2 путь 3)	17 м	по рабочим	Москва Белорусская → Одинцово	138 руб.
15:30 РЭКС ★ (пл. №1 тулик 9)	15:47 (пл. 2 путь 3)	17 м	по рабочим	Москва Белорусская → Одинцово	138 руб.
16:30 РЭКС ★ (пл. №1 тулик 9)	16:47 (пл. 2 путь 3)	17 м	по рабочим	Москва Белорусская → Одинцово	138 руб.
17:19 РЭКС ★	17:42	23 м	ежедневно	Москва Белорусская → Одинцово	138 руб.
17:30 РЭКС ★ (пл. №1 тулик 9)	17:47 (пл. 2 путь 3)	17 м	по рабочим	Москва Белорусская → Одинцово	138 руб.
18:30 РЭКС ★ (пл. №1 тулик 9)	18:47 (пл. 2 путь 3)	17 м	по рабочим	Москва Белорусская → Одинцово	138 руб.
19:18 РЭКС ★	19:43	25 м	ежедневно	Лобня → Можайск	138 руб.
19:30 РЭКС ★ (пл. №1 тулик 9)	19:47 (пл. 2 путь 3)	17 м	по рабочим	Москва Белорусская → Одинцово	138 руб.
19:45 РЭКС ★	20:10	25 м	ежедневно	Лобня → Звенигород	138 руб.
20:30 РЭКС ★ (пл. №1 тулик 9)	20:47 (пл. 2 путь 3)	17 м	по рабочим	Москва Белорусская → Одинцово	138 руб.
21:30 РЭКС ★ (пл. №1 тулик 9)	21:47 (пл. 2 путь 3)	17 м	по рабочим	Москва Белорусская → Одинцово	138 руб.
22:30 РЭКС ★ (пл. №1 тулик 9)	22:47 (пл. 2 путь 3)	17 м	по рабочим	Москва Белорусская → Одинцово	138 руб.

Next participants need to get out of the railway station building, at the Amaltea or Technopark bus stop take the bus № 5 of the internal route (free of charge) and get to the “Matryoshka” (Matrix) station, then follow the pointer to the venue of the event.

Estimated travel time is 45-50 minutes.

3) **By leased shuttles** for transportation of ISNN participants. Shuttles will be departed from Borodino Panorama (you need to get to the Park Pobedy subway station), guests will be met by an accompanying person with a sign-pointer "Skoltech, ISNN-2019", the **meeting point is located at Kutuzovsky lane 38, build.1 (Monument to Mikhail Kutuzov)**. Shuttles will deliver guests to the conference venue. Scheme is attached.



Shuttle departure time:

July 11, 2019 - 07:15 a.m.

July 12, 2019 - 08:15 a.m.

Estimated travel time is 30 minutes. Travel is free of charge.

4) **By taxi.** To order a taxi, go to <https://taxi.yandex.ru/>.

Place of arrival of the car: Hypercube, Skolkovo Innovation Center, Malevich str., 1 bld.

In case of emergency please use this phone number: +7 (909) 951 1234 - Aleksandra

Metro scheme with marked locations indicated in the points above and **Skolkovo map** are attached below:

