

2023 IEEE Ural-Siberian Conference on Computational Technologies in Cognitive Science, Genomics and Biomedicine (CSGB 2023)

**Novosibirsk, Russia
28-29 September 2023**



**IEEE Catalog Number: CFP23H38-POD
ISBN: 979-8-3503-0798-6**

**Copyright © 2023 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP23H38-POD
ISBN (Print-On-Demand):	979-8-3503-0798-6
ISBN (Online):	979-8-3503-0797-9

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

Limits of Applicability of Ultrashort Laser Pulses in the Study of DNA Molecules.....	1
<i>Anastasia A. Kharlamova</i>	
Cognitive Disorders of Geriatric Patients in Urological Operations	5
<i>Kochetkova Marya, Soluyanov Michail, Smagin Alexandr, Siutkina Irina, Demura Alexandr, Khabarov Dmitriy</i>	
Comparative Analysis of Methods of Nonlinear Dynamics for the Problem of Monitoring the State of Anesthesia During an Operation	9
<i>Lyudmila A. Manilo, Karina S. Starchenkova</i>	
Examine the Impact of Polydemethylsiloxane and Aluminum Oxide's Modified with Lithium, Silver, Magnesium, and Manganese Ions Composition on the Function of Mesenchymal Stem Cells and Fibroblasts	13
<i>Alexander Lykov, Lubov Rachkovskaya, Edmund Rachkovsky, Maria Surovtseva, Irina Kim, Natalia Bondarenko, Olga Poveshchenko</i>	
Met Allele of BDNF Gene is Protective Factor Against Age-Related Decline in Left Hemisphere Short-Term Verbal Memory.....	17
<i>Evgeniya Yu. Privodnova, Nina V. Volf</i>	
Rates of Compartmentalization of Visceral Lymph Nodes in Aging.....	21
<i>Vladimir Gorchakov, Serik Abdreshov, Bayan Nurmakhanova, Anar Eshmukhanbet, Ekaterina Amansakhatova, Makpal Esenova</i>	
Sorbent Modified with Single-Wall Carbon Nanotubes: Evaluation of Influence on Hemostatic Reaction “In Vitro”.....	25
<i>Lubov Rachkovskaya, Andrey Momot, Edmund Rachkovsky, Alexander Smagin, Andrey Mamaev, Maxim Korolev, Andrey Letyagin</i>	
BCI Assisted Motor Function Improvement and Recovery in Children with Cerebral Palsy	29
<i>Pavel Bobrov, Sokolova Anastasia, Evgeniy Lukyanov, Roman Lyukmanov, Lajsheva Olga</i>	
Serum Chitinase-3-Like Protein 1 (CHI3L1/YKL-40) is Associated with Diabetic Nephropathy but Not with Glycemic Control Or Glucose Variability in Patients with Type 1 Diabetes	33
<i>Kamilla R. Mavlianova, Nikolay B. Orlov, Vadim V. Klimontov</i>	
Studies of Melatonin Releasing into Solution from the Surface of Porous Carrier Based on Aluminum Oxide and Polydimethylsiloxane.....	37
<i>Alexandra Shvetsova, Lubov Rachkovskaya, Edmund Rachkovsky, Pavel Madonov, Pavel Miroshnikov, Dmitry Yaroslavtsev</i>	
Cluster Analysis of Glucose Fluctuations in the Pre-Morning and Early Morning Hours in Patients with Type 1 Diabetes	41
<i>Danil E. Kladov, Julia F. Semenova, Vladimir B. Berikov, Vadim V. Klimontov</i>	
Review of the Mean Field Models for Predicting the Spread of Viral Infections.....	45
<i>Viktoriya Petrakova, Olga Krivorotko, Andrei Neverov</i>	
The Concept of Sense in the Aspect of the Theory of Algorithms.....	51
<i>Sergey Fadyushin, Elena Vereschagina, Yana Pafnuteva, Su En Kim</i>	

Theoretical Aspects of the Semantics of Generated Music	56
<i>Anneta Kayak, Elena Vereschagina, Sergey Fadyushin, Yana Pafnuteva, Alexander Tretyak</i>	
Research of Algorithms for Binary Classification of Biomedical Data for Recognition of Periodontal Tissue State	60
<i>Andrey V. Demidov, Michael V. Demidov, Elizaveta S. Akishina, Sergey M. Gerashchenko</i>	
Investigation of the Process of Pressure Transfer from the Artery to the Cuff, Taking into Account the Soft Tissues of the Shoulder Tissue	64
<i>Viktor V. Karnaukhov, Elizaveta S. Akishina, Sergey M. Gerashchenko</i>	
Analysis of Curtobacterium Genomic Sequences Reveals the Basis for Further Taxonomic Refinements	69
<i>Peter Evseev, Alexander Ignatov, Lubov Dorofeeva, Konstantin Miroshnikov</i>	
Effects of Aluminum Oxide and Polydimethylsiloxane on HIF1A Expression in the Brains of Db/Db Mice with Genetically Determined Development of Obesity and Type II Diabetes Mellitus.....	74
<i>Svetlana V. Michurina, Anastasia E. Serykh, Irina Yu. Ishchenko</i>	
Thermography of Lower Limbs Varicose Veins: Mathematical Modeling.....	79
<i>Larisa Zhorina, Egor Tolstoy, Yuri Shishkin</i>	
Dictionary-Based Medical Text Analysis in Uzbek: Overcoming the Low-Resource Challenge.....	85
<i>Davlatyor Mengliyev, Vladimir Barakhnin, Mukhriddin Eshkulov, Bozorboy Palvanov, Nilufar Abdurakhmonova, Saida Khamraeva</i>	
The Effect of a Familiar and Unfamiliar Lecturer on Attention Level and Assimilation of Information in a Video Lecture: Preliminary Experimental Data	90
<i>Maksim Sorochinskiy, Philip Koryakin, Mikhail Cherepanov</i>	
Cognitive Rehabilitation in Virtual Reality (Modern Review).....	94
<i>A. A. Kuznetsov, T. S. Petrenko, V. I. Borisov</i>	
Benefits of Mirror Weight Symmetry for 3D Mesh Segmentation in Biomedical Applications	100
<i>Vladislav Dordiuk, Maksim Dzhigil, Konstantin Ushenin</i>	
The Possibilities of Photodynamic Therapy in Management of Chronic Wounds	108
<i>Danila Chernopyatov, Oleg Shumkov, Mikhail Smagin, Vadim Nimaev</i>	
Diagnosis Neuro-Oncology Diseases Via Artificial Intelligence and Multi-Sequence MRI Methods	112
<i>Andrey Letyagin, Evgeniya Amelina, Bair Tuchinov, Vladimir Groza, Mikhail Amelin, Sergey Golushko, Evgeniy Pavlovskiy</i>	
Mathematical Modeling of Interactions Between Adipogenesis, Fibrosis and Interstitial Fluid Exchange May Be Useful for Lymphedema Study	118
<i>Irina Shvab, Rustam Khapaev, Vadim Nimaev</i>	
Compressor-Based Classification for Atrial Fibrillation Detection.....	122
<i>Nikita Markov, Konstantin Ushenin, Yakov Bozhko, Olga Solovyova</i>	
Vectorcardiogram Planarity Index Predicts Response to Cardiac Resynchronisation Therapy	128
<i>Arsenii Dokuchaev, Stepan Zubarev, Varvara Pozdina, Yury Teregulov, Dmitri Lebedev</i>	
Benefits of NGS for Genetic Testing of Primary Lymphedema	133
<i>Nataliav. Kokh, Koksharova Galina Sergeevna, Maria Gridina, Dinara Ivanoshchuk, Veniamin Fishman, Vadim Nimaev</i>	

Effect of Exogenous Melatonin on the LYVE-1 Expression in Liver Sinusoids of db/db Mice with Obesity and DM2	137
<i>Irina Yu. Ishchenko, Svetlana V. Michurina, Dmitry V. Vasendin, Sergey A. Arkhipov, Valentina V. Arkhipova, Anastasia E. Serykh</i>	
Nonlinear Absorbers Based on Composites of Multi-Walled Carbon Nanotubes for the Protection of Sensitive Elements of Optoelectronic Systems and Organs of Vision	142
<i>Mikhail S. Savelyev, Pavel N. Vasilevsky, Uliana E. Kurilova, Alexander Yu. Tolbin, Alexander Yu. Gerasimenko</i>	
Is Body Composition Associated with SARC-F Questionnaire and Functional Test in Women with Rheumatoid Arthritis?	146
<i>Vitaly Omelchenko, Angelina Starshova, Yuliya Kurochkina, Elena Letyagina, Yuliya Ubshaeva, Anastasiya Fedorova, Nadezhda Banshchikova, Maxim Korolev</i>	
Deep Learning -Based Algorithm for MRI Lumbar Vertebrae Instance Segmentation	150
<i>Walid Ai-Haidri, Ekaterina Brui, Indira Usmanova, Farkhad Salimov, Ainur Akhatov, Mohammed Al-Habeeb, Kamil A. Il'Yasov</i>	
Eye-Tracking Pilot Software Description	154
<i>Sergey N. Chistiakov, Anton Yu. Dolganov, Aleksei Zhdanov, Marina A. Shurupova, Alina D. Aizenshtein, Galina Ivanova</i>	
Applying the Eye-Tracking Method for the Classification of Neurological Disorders, Mental Diseases, and Speech Impairments Based on Machine Learning: An Overview.....	160
<i>Marina A. Shurupova, Alina D. Aizenshtein, Sergey N. Chistiakov, Anton Yu. Dolganov, Aleksei Zhdanov, Galina E. Ivanova</i>	
Modeling of Thermal Processes in Human Skin Layers When Measuring a Heat Flux Density	165
<i>Alexander Kozlov, Kseniya Baklanova, Maria Potudanskaia</i>	
Artificial Sensations Evoked by Transcutaneous Electrical Nerve Stimulation: Investigating the Parameters Space.....	171
<i>Nikita Piliugin, Mikhail Knyshenko, Alexandra Sain, Ekaterina Antipushina, Gurgen Soghoyan, Mikhail Lebedev</i>	
Application of Biotechnology and Digitalization in Mineral Extraction.....	175
<i>Mikhail F. Mitsik, Marina V. Byrdina, Tatiana P. Lopatchenko, Igor M. Maltsev, Olga A. Aleynikova</i>	
Optically Pumped Magnetometers in the MEG-Research at the Higher School of Economics	180
<i>Nikita Fedosov, Daria Medvedeva, Oleg Shevtsov, Alexei Ossadtchi</i>	
Hardware Powered Ultra Low Latency (HarPULL) Brain-State Dependent TMS Technology.....	189
<i>Nikita Fedosov, Julia Nekrasova, Milana Makarova, Oleg Shevtsov, Daria Medvedeva, Alexei Ossadtchi</i>	
Towards an EMG-Based Decoder of Natural Motor Intentions	196
<i>Vladislav Aksiotis, Alexei Ossadtchi</i>	
Inferring Values of Epidemic Indicators Via SEIR Models to Enhance Epidemiological Surveillance in Russia	202
<i>Aleksandr Kharlunin, Israel Huaman, Vasiliy Leonenko</i>	
Topological Dynamics of Functional Brain Connectome in Working Memory Processing	208
<i>Ilia Maksimovich Ernston, Timofey Valerievich Adamovich</i>	

Deep Active Inference Agent with Continuous Action Space	215
<i>Fedosov Nikita, Alexey Voskoboynikov</i>	
A Novel Approach to Modeling and Visualisation of Epidemic Outbreaks: Combining Manual and Automatic Calibration	221
<i>Kseniya Sahatova, Aleksandr Kharlunin, Vasily Leonenko</i>	
Influence of Myocardial Fibrosis on Ventricular Activation in LBBB and During Biventricular Pacing: Simulation Study	227
<i>Svyatoslav Khamzin, Anastasia Bazhutina, Alexander Makarov</i>	
Statistical Shape Analysis Reveals Specific Features of Left Ventricular Wall Motion in Patients with Chronic Heart Failure	231
<i>Roman Rokeakh, Tatiana Chumarnaya, Stepan Zubarev, Dmitry Lebedev, Olga Solovyova</i>	
Personalized Cardiac Computer Models and Machine-Learning for Target Vein Selection in Cardiac Resynchronisation Therapy	236
<i>Anastasia Bazhutina, Konstantin Ushenin, Svyatoslav Khamzin, Vasily Kabak, Stepan Zubarev, Dmitry Lebedev, Olga Solovyova</i>	
A Challenge for Bringing a BCI Closer to Motor Control: The “Interface Uncanny Valley” Hypothesis	242
<i>Artem S. Yashin</i>	
Genes, Related to Trastuzumab and Lapatinib Resistance in Breast Cancer: Bioinformatic Analysis and Comprehensive Review	248
<i>Sofia Shifon, Ilya Evgenov, Polina Karitskaya, Anna Chesnokova, Irina Karpets, David Mendl Tseilikman</i>	
Block of Electrical Excitation Conduction During the Development of Ischemia in a Mathematical Model of Cardiac Tissue	255
<i>Alexander Kursanov, Nathalie Balakina-Vikulova, Leonid Katsnelson</i>	
EEG Study of Decision-Making in Uncertain and Risky Situations Via a Gamified Environment	259
<i>Dmitri Lebedkin, Grigory Chernov, Ksenija Ladonovskaya, Pavel Rudych, Alexis Belianin</i>	
Meta-Optimization of Initial Weights for More Effective Few- And Zero-Shot Learning in BCI Classification	263
<i>Daniil A. Berdyshev, Artem M. Grachev, Sergei L. Shishkin, Bogdan L. Kozyrskiy</i>	
Haptoglobin Phenotypes in Patients with Type 2 Diabetes and Carotid Atherosclerosis	268
<i>Elena A. Koroleva, Maksim V. Dashkin, Rustam S. Khapaev, Vadim V. Klimontov</i>	
Phylogenomics of Life Kingdom's Deubiquitinases	273
<i>Alena Evpak, Peter Evseev, Anna Kudriaeva, Alexey Belogurov</i>	
Electrical Remodeling and Arrhythmogenicity of Ventricular Myocardium in Streptozotocin-Induced Diabetes Mellitus	279
<i>Ekaterina Sedyakina, Michail Gonotkov, Alena Tsvetkova, Jan Azarov, Alexey Ovechkin</i>	
How to Design the Biofeedback Training for the Rehabilitation of PTSD Patients?	283
<i>Olga Bazanova, Alexander Zakharov, Irina Larkova, Tatiana Maryanovskaya, Andrey Melnikov, Sargylana Ermolaeva, Ekaterina Nikolenko, Igor Shirolapov</i>	

Author Index