

2020 IEEE 8th Workshop on Advances in Information, Electronic and Electrical Engineering (AIEEE 2020)

**Vilnius, Lithuania
22 – 24 April 2021**



**IEEE Catalog Number: CFP20A96-POD
ISBN: 978-1-6654-3087-6**

**Copyright © 2021 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:	CFP20A96-POD
ISBN (Print-On-Demand):	978-1-6654-3087-6
ISBN (Online):	978-1-6654-2538-4

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

Contents

A. Keynote Speech

Engineering Education and Advances in Information, Automation and Electrical Engineering...1

Nadezhda Kunicina

B. Electronic Engineering Track

1. Electroporation Cuvette with Integrated Electrodes for High Gradient Electric Field Generation...7

Arūnas Murauskas; Vitalij Novickij

2. Concept of a Modular Electro-Acoustic Stand for Research and Education...10

Santis Vanags; Rahims Geidarovs

3. Emulation of x86 Computer on FPGA...16

Stepan Vyazigin; Anuar Dyuseмбаev; Madina Mansurova

4. MAS Concept for PIR Sensor-Based Lighting System Control Applications...22

Krists Kviesis; Leslie Robert Adrian; Ansis Avotins; Olegs Tetervenoks; Donato Repole

5. Capacitive Proximity Sensor Maximum Range Dependence on Geometry and Size...27

Ricards Porins; Peteris Apse-Apsitis

6. Multiple Scenario and Criteria Approach for Optimal Solution and Sizing of Household off-grid System...31

Kārlis Gičevskis; Oļegs Linkevičs; Edgars Groza; Santa Ķiene

7. PIR-Sensor Based Street Lighting System Control...38

Ricards Porins; Peteris Apse-Apsitis; Ansis Avotins

C. Electrical Engineering Track

1. Determination of the Metal Structure, Testing of Hardness of the Fastening Bolts of the Rubber-cord Coupling for Traction Gear of Electric Trains of the ER2 Series...42

Dmitrijs Gorbacovs; Pavels Gavrilovs; Janis Eiduals

2. Synchronous Inductor Generator with Electrically Integrated Armature and Field Windings with Improved Performance...46

Karlis Gulbis; Edmunds Kamolins; Uldis Brakanskis

3. Peculiarities of Multilevel Power Electronic Converters for Interfacing Battery Energy Storages with AC Loads...52

Alexander Bubovich; Maxim Vorobyov; Andrei Blinov; Dimosthenis Peftitsis

4. Analysis of Experimental Railway Point Electric Heating System...56

Ruslans Muhitovs; Mareks Mezitis; Andrejs Spunitis; Vladimirs Iriskovs

5. Selection of Power Supply Elements for Cow Rumen Smart Bolus...61

Kristaps Vitols

6. Possibilities of Parametric Adaptation of Inductors of Current-smoothing Converter Links to Load Conditions...66

Ivars Rankis; Aigars Vitols; Mārcis Priedītis

D. Information Engineering Track

1. Investigation of MRI Prostate Localization Using Different MRI Modality Scans...73

Justinas Jucevičius; Povilas Treigys; Jolita Bernatavičienė; Rūta Briedienė; Ieva Naruševičiūtė; Mantas Trakymas

2. Fiscalization Instruments and Concepts for Digital Economy Enhancement...78

Konstantins Talikovs; Anna Litvinenko

3. Investigation of Deep Neural Networks for Hypoid Gear Signal Classification to Identify Anomalies...83

Tadas Žvirblis; Linas Petkevičius; Pranas Vaitkus; Eldar Šabanovič; Viktor Skrickij; Artūras Kilikevičius

4. Information Monitoring System of Social Wellness Opinions...89

Nurgali Kadyrbek; Zhanerke Sundetova; Saule Torekul

5. Perceptually Motivated Feature set for Vocal Folds State Assessment...93

Monika Danilovaitė

6. The Problem of Named Entities Unification based on Geographical Ontologies...97

Talshyn Sarsembayeva; Madina Mansurova; Darya Chikibayeva; Darya Karymsakova

7. Development of a New Body Motion Parameters Acquisition System...103

Pāvels Maksimkins; Armands Šēnfelds; Jūlija Maksimkina; Leonīds Ribickis

E. Telecommunication Engineering Track

1. Challenges and Solutions for Resilient Telemedicine Services...108

Andrejs Romanovs; Edgars Sultanovs; Egons Buss; Yuri Merkuryev; Ginta Majore

2. Analysis of Frequency Characteristics of Meander Structures with Different Connecting Electrodes...115

Diana Belova-Plonienė; Andrius Katkevičius

3. FPGA Implementation and Study of Synchronization of Modified Chua's Circuit-based Chaotic Oscillator for High-speed Secure Communications...119

Filips Capligins; Anna Litvinenko; Arturs Aboltins; Deniss Kolosovs

4. Prediction of Parameters of Semiconductor Band-pass Filters using Artificial Neural Network...125

Vaiva Rusen; Audrius Krukonis; Darius Plonis

5. About Simultaneous Information and Power Transfer in WSN using Frequency Modulation...129

Anna Litvinenko; Romans Kusunins; Arturs Aboltins; Janis Eidaks; Dans Laksis; Jurijs Sadovksis

6. Methodology for Construction of Multi-approach Based Digital Twin in Strategic Communication...135

Mairita Zake; Ginta Majore; Gatis Krumins; Zigurds Zakis

7. Smart Trash Bin Segregation and Identify and Create Alerts on the Level of Waste Present in the Trash Bin...141

Divya Jyothi Dasari; Venkata Satyadeep Velala; Bilguun Ganbaatar; Nadezdha Kunicina