

# Program of 2024 WETI and WEiA Workshop for PhD Students and Young Researchers

Date: Mon., July 1, 2024

Venue: Bldg. B of the Faculty of Electronics, Telecommunications and Informatics

## Plenary Session

**9:15 AM – room NE Aud. 1**

Chair: Prof. Jarosław Guziński, PhD, DSc. & Piotr Płotka, PhD, DSc.

1-1 **Welcome speech**, Jarosław Guziński & Piotr Płotka

1-2 **How to publish research articles in IEEE** (invited), Atif Iqbal, Qatar Univ.

1-3 **Getting experimental results when using machine learning** (invited), Sebastián García Galán, Jaén Univ.

1-4 **Carbon nanowalls in sensors** (invited), Mateusz Ficek, Gdańsk Univ. of Technology.

## Breaks

**11:15 – 11:30** *Coffee break*

**13:30 – 14:00** *Pizza and coffee break*

**16:00 – 16:15** *Coffee break*

The free pizza and beverages will be served at the ground floor.

## **Session 2 - Power Electronics**

### **Session 2A – 11:30 – 13:30 – room NE Aud. 1**

Chair: Prof. Jarosław Guziński

- 2A-1 **Fully Isolated Modular DC/DC Converter for High Power Pulse Forming - Overview and Design**, Paweł Milewski (*advisor: Prof. R. Strzelecki*)
- 2A-2 **Current-Fed Multi-Active Bridge DC-DC Converter with Bidirectional EV Charging Ports**, Mykola Lukianov (*advisor: Prof. R. Strzelecki*)
- 2A-3 **Analysis of Systems for Limiting Voltage and Shock Currents for Photovoltaic Installations During Firefighting Operations**, Kondrad Seklecki (*advisor: Prof. M. Olesz*)
- 2A-4 **Development Of Soft Switched Current Source Inverter for Hydrogen Energy Sources**, Muhammad Kamran (*advisor: Prof. M. Turzyński*)

*13:30 – 14:00 Pizza and coffee break*

### **Session 2B – 14:00 – 16:00 – room NE Aud. 1**

Chair: Prof. Arkadiusz Lewicki

- 2B-1 **Sensorless Control of High-Speed Induction Motor with Iron Loss Minimization**, Tadele Ayana (*advisor: Prof. M. Morawiec*)
- 2B-2 **Sensorless Control with Multi-Scalar Transformation of Five-Phase IPMSM**, Deepak Vyas (*advisor: Prof. M. Morawiec*)
- 2B-3 **Sensorless Speed Control of Induction Motor for Electric Vehicles**, Lelisa Wogi (*advisor: Prof. M. Morawiec*)
- 2B-4 **Active Power Filter With Silicon Carbide (SiC) Transistors Designed For Medium Voltage Industrial Networks**, Janusz Szewczyk (*advisor: Prof. M. Adamowicz*)

*16:00 – 16:15 Coffee break*

### **Session 2C – 16:15 – 18:15 – room NE Aud. 1**

Chair: Prof. Marcin Morawiec

- 2C-1 **High Efficiency Isolated Bidirectional 10kW DC-DC Inverter with High Frequency Transformer and Voltage Ratio >10**, Jędrzej Pietryka (*advisor: Prof. M. Adamowicz*)
- 2C-2 **Diagnostics of the Insulation Condition of a 6kV Electric Motor by Measuring Partial Discharges Using Electrical and Acoustic Imaging Methods**, Marcin Gulczyński (*advisor: Prof. M. Adamowicz*)
- 2C-3 **High Efficiency Step-Up Hybrid Switched-Capacitor Multilevel Inverter**, Ahmed Awadelseed (*advisor: Prof. A. Lewicki*)

## **Session 3 – Med. A.I. and Neural Networks**

### **Session 3A – 11:30 – 13:30 – room NE 105**

Chair: Prof. Atif Iqbal

- 3A-1 Temporal Coordination of High Frequency Oscillations Across the Human Cortex Reflects Memory Processing**, Sathwik Prathapagiri (*advisor: Prof. A. Czyżewski*)
- 3A-2 Prefrontal Electroencephalogram Theta Activities Indicate Memory and Executive Function Performance**, Nastaran Hamedisheihani (*advisor: Prof. A. Czyżewski*)
- 3A-3 Streamed Optical Flow Adaptation from Synthetic to Real Dental Scenes & Datasets**, Emilia Lewandowska (*advisor: Prof. P. Szczuko*)
- 3A-4 Presentation Attack Detection in Finger Vein Recognition System**, Kashif Shaheed (*advisor: Prof. P. Szczuko*)

*13:30 – 14:00 Pizza and coffee break*

### **Session 3B – 14:00 – 16:00 – room NE 105**

Chair: Prof. Jerzy Wtorek

- 3B-1 Analysis Dual-Energy X-ray Images Using Convolutional Neural Networks**, Kamil Jańczyk (*advisor: Prof. J. Rumiński*)
- 3B-2 Methods of Evaluating Skin Condition Parameters Using Machine Learning: Presentation of Current Achievements and Research Plans**, Milena Sobotka (*advisor: Prof. J. Rumiński*)
- 3B-3 Domain Adaptation Methods for Medical Imaging: Presentation of Current Achievements and Research Plans**, Paulina Leszczelowska (*advisor: Prof. J. Rumiński*)
- 3B-4 Determining Audio/Visual Stimulation in the Context of ASMR**, Sahar Seifzadeh (*advisor: Prof. B. Kostek*)

*16:00 – 16:15 Coffee break*

### **Session 3C – 16:15 – 18:15 – room NE 105**

Chair: Prof. Jerzy Wtorek

- 3C-1 Synthesising Dysarthric Speech for the Dysfunctional Speech Recognition Task**, Tomasz Piernicki (*advisor: Prof. B. Kostek*)
- 3C-2 Innovative Approaches to Urinary Tract Infection Management: Utilizing Fiber Optic Sensors and Artificial Intelligence**, Kacper Cierpiak (*advisor: Prof. M. Szczerska*)
- 3C-3 The Application of a Generative Adversarial Network to Enhance the Classification of Hearing Loss Types**, Michał Kassjański (*advisor: Prof. M. Kulawiak*)
- 3C-4 Annotation of medical data using Large Language Models**, Franciszek Górski (*advisor: Prof. A. Czyżewski*)

## **Session 4 – A.I. and Neural Networks**

### **Session 4A – 11:30 – 13:30 – room NE 106**

Chair: Prof. Jacek Rumiński

- 4A-1 **Machine Learning Methods of Marine Data Fusion and Uncertainty Handling for Positioning, Navigation and Timing (PNT)**, Natalia Ziólkowska (*advisor: Prof. J. Szlapczyńska*)
- 4A-2 **Advancing Solar Energy: Machine Learning Approaches for Predicting Photovoltaic Power Output**, Kawsar Nassereddine (*advisor: Prof. M. Turzyński*)
- 4A-3 **Machine Learning-Based Interactive Multi-Objective Optimization Framework for Software Overtime Planning**, Mojeed Hammed (*advisor: Prof. R. Szlapczyński*)
- 4A-4 **Improving Deep Learning with Many Nonlinear Layers**, Rafał Wolniak (*advisor: Prof. B. Kostek*)

*13:30 – 14:00 Pizza and coffee break*

### **Session 4B – 14:00 – 16:00 – room NE 106**

Chair: Prof. Piotr Szczuko

- 4B-1 **Improving Transparency and Explainability of AI-Based Decision Support Systems with Special Attention to Medicine**, Jakub Buler (*advisor: Prof. M. Grochowski*)
- 4B-2 **Optimizing the Control of Wastewater Treatment Plants with Reinforcement Learning**, Zuzanna Klawikowska (*advisor: Prof. M. Grochowski*)
- 4B-3 **Towards Efficient and Trustworthy Decision Support Systems**, Rafał Buler (*advisor: Prof. M. Grochowski*)
- 4B-4 **Frame Interpolation Pre-training for Better Implicit Motion Estimation in Efficient Video Denoising**, Piotr Kopa Ostrowski (*advisor: Prof. T. Stefański*)
- 4B-5 **A Physics-guided Neural Network for Flooding Area Estimation Using SAR Imagery and Local River Gauge Observations**, Monika Gierszewska (*advisor: Prof. Z. Łubniewski*)

## **Session 5 – Materials, Technologies, Devices**

### **Session 5A – 11:30 – 13:30 – room NE 109**

Chair: Prof. Robert Bogdanowicz

- 5A-1 **Conductive Hydrogel-Based Composite Materials for Flexible Energy Conversion and Storage Devices**, Gabriela Małyszko (*advisor: Prof. P. Jasiński*)
- 5A-2 **High-Temperature Oxidation of Alloy Powders**, Agnieszka Drewniak (*advisor: Prof. S. Molin*)
- 5A-3 **Enhanced Electrochemical Performance of Partially Amorphous  $\text{La}_{0.6}\text{Sr}_{0.4}\text{CoO}_{3-\delta}$  Oxygen Electrode Materials for Low-Temperature Solid Oxide Cells Operating at 400 °C**, Bartłomiej Lemieszek (*advisor: Prof. S. Molin*)
- 5A-4 **An Optimized Dissolved Oxygen Concentration Control in Sequencing Batch Reactor with the Use of Adaptive and Predictive Control Schemes**, Tomasz Ujazdowski (*advisor: Prof. R. Piotrowski*)

*13:30 – 14:00 Pizza and coffee break*

### **Session 5B – 14:00 – 16:00 – room NE 109**

Chair: Prof. Piotr Jasiński

- 5B-1 **Optoelectrical Properties of Tin-Boron Doped Diamond Manufactured with CVD Technology**, Mariusz Banasiak (*advisor: Prof. R. Bogdanowicz*)
- 5B-2 **Laser Induced Carbon Microstructures: Preliminary Research and Literature Study**, Franciszek Skiba (*advisor: Prof. R. Bogdanowicz*)
- 5B-3 **Preparation of Electrodes Using the Dip-Coating Method to Increase the Kinetics of the Oxygen Evolution Reaction in Alkaline Water Electrolyzers**, Katarzyna Ostrowska (*advisor: Prof. S. Molin*)
- 5B-4 **Deposition of ceramic coatings by spray pyrolysis method**, Maryam Mehdizade (*advisor: Prof. S. Molin*)

*16:00 – 16:15 Coffee break*

### **Session 5C – 16:15 – 18:15 – room NE 109**

Chair: Prof. Piotr Jasiński

- 5C-1 **System of gas detection by two-dimensional materials - comparison of selected sensing devices**, Katarzyna Drozdowska (*advisor: Prof. J. Smulko*)
- 5C-2 **Optical methods for detecting changes associated with diseases indicators in wastewater**, Patryk Sokołowski (*advisor: Prof. M. Szczerska*)
- 5C-3 **Enhancing the Electrooxidation of Persistent Chemicals Through Boron-Doped Diamond-Metal Oxide Heterojunction**, Iwona Kaczmarzyk (*advisor: Prof. R. Bogdanowicz*)
- 5C-4 **Analysis of Urban Wastewater for Biomarkers Using UV-Vis and Raman Spectroscopy**, Adam Władziński (*advisor: Prof. M. Szczerska*)

## **Session 6 – Electrodynamics and ASICs**

**11:30 – 13:30 – room NE 110**

Chair: Prof. Piotr Kowalczyk

**6-1 Novel Approach of EMI Reduction in a GaN-Based High-Frequency Power Converter for the Renewable Energy Source**, Arsalan Muhammad Soomar (*advisor: Prof. P. Musznicki*)

**6-2 Design of Microwave Filters for Space Applications by Smooth Geometry Deformation and Manufacturing by 3D Printing**, Michał Baranowski (*advisor: Prof. A. Lamęcki*)

**6-3 Correction Methods for Low-Cost Measurements of Small Antennas in Non-Anechoic Environments**, Vorya Waladi (*advisor: Prof. A. Bekasiewicz*)

**6-4 Time to Digital Converters in ASIC and FPGA Devices**, Jacek Goczkowski (*advisor: Prof. M. Wójcikowski*)

*13:30 – 14:00 Pizza and coffee break*

## **Session 7 – Informatics and Networks**

**11:30 – 13:30 – room NE 104**

Chair: Prof. Jerzy Konorski

**7-1 How Decoherence Affects the Security of BB84 Quantum Key Distribution Protocol**, Robert Okuła (*advisor: Prof. D. Dereniowski*)

**7-2 Decomposition of Microservices Using Event Storming and Multi-Objective Optimization**, Vadim Peczyński (*advisor: Prof. J. Szlapczyńska*)

*13:30 – 14:00 Pizza and coffee break*