

# IEEE CANDO-EPE 2024



## IEEE 7<sup>th</sup> International Conference AND Workshop in Óbuda on Electrical and Power Engineering

October 17-18, 2024

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Budapest, Hungary



**October 17, 2024, Thursday**

**Location: Room I. 122**

**Kandó Kálmán Faculty of Electrical Engineering, Óbuda University**

**Address: Tavaszmező utca 17, H-1084 Budapest, Hungary**

**9:00 – 10:00      Registration**

**10:00 – 10:20      Opening Ceremony**

Local Organizing Committee Chairs:

**Zsolt Temesvári, József Katona**

General Chairs:

**József Kopják**, Dean of Kandó Kálmán Faculty of Electrical Engineering

**György Molnár**, Head of Teachers' Training Center

Guests of Óbuda University:

**László Gulácsi**, Vice Rector for Research

**Péter Galambos**, Vice Rector for Innovation

**Dániel András Drexler**, IEEE Hungary Section Vice-Chair

**10:20 – 12:00**      **Plenary Session**

**10:20**      **Stronger or Smarter - Electricity Grid**

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**Ferenc Molnár**

*Hungarian Electricity Works Ltd. (MVM), Budapest, Hungary*

**10:40**      **IQRF Wireless Mesh Reliable by Definition**

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**Vladimir Sulc**

*MICRORISC s.r.o. Jičín, Czech Republic*

**11:00**      **Researches on Power Consumption Signatures Usage in  
Characterization of Electrical, Electronic and Computer  
Devices**

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**Marius Marcu**

*Faculty of Electrical Engineering, Timisoara University of Technology,  
Târgu Mureş, Romania*

**11:20**      **Agrovoltaics Systems across in Europe and across the World**

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**Francesco Paulo Lamacchia**

*Zero Energy Buildings First Italian Network Rome, Italy*

**11:40**      **Architecture of IoT Sensor Data Acquisition Systems and IoT  
Data Processing for Anomaly Detection**

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**József Domokos**

*Sapientia Hungarian University of Transylvania, Târgu Mureş,  
Romania*

**12:00 – 13:00**      **Lunch**

(Room I. 122)

13:00 – 15:00 **E-Poster Session**

Session Chair: **Miklós Mezei**

Secretary: **Tamás Nógrádi**

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**Timed Digital Cascade Control of Gas-filled Tubes**

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**Bertalan Beszédes**

*Obuda University, Székesfehérvár, Hungary*

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**Comparative Analysis of Single, Double, and Triple Diode Models for Accurate I-V Curve Fitting of Perovskite Solar Cells**

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**Ahmad Halal, Balázs Plesz**

*Budapest University of Technology and Economics, Budapest, Hungary*

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**Exploring the Influence of Digital Media on Secondary School Students' Daily Lives**

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**Előd Gógh**

*Eszterházy Károly Catholic University, Eger, Hungary*

**Attila Kovari**

*Eszterházy Károly Catholic University, Eger, Hungary*

*Obuda University, Budapest, Hungary*

*University of Dunaujvaros, Dunaujvaros, Hungary*

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**Use of Digital Platforms for Enhancing Academic Performance. Systematic Review**

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**Cristina Anamaria Costescu, Mălina Şogor, Sabina Pălimariu, Ioana Tufar, Carla Maria Avram**

*Babeş-Bolyai University, Cluj-Napoca, Romania*

**Jozsef Katona**

*Obuda University, Budapest, Hungary*

*University of Dunaujvaros, Dunaujvaros, Hungary*

*John Von Neumann University, Kecskemet, Hungary*

*Budapest Business University, Budapest, Hungary*

## **ChatGPT the Omniscient? A Guide to Effective Prompting**

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**Attila Kovari**

*Eszterházy Károly Catholic University, Eger, Hungary*

*Obuda University, Budapest, Hungary*

*University of Dunaujvaros, Dunaujvaros, Hungary*

## **Effect of Stiffness Difference of Forefoot Transverse Arch on Foot Biomechanics**

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**Qiaolin Zhang, Hairong Chen**

*Obuda University, Budapest, Hungary*

**István Bíró**

*University of Szeged, Szeged, Hungary*

## **Enhancing Password Security: Analyzing Password Management Practices Among IT Students**

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**Anita Mihalovicsne Kollar**

*University of Dunaujvaros, Dunaujvaros, Hungary*

**Jozsef Katona**

*Obuda University, Budapest, Hungary*

*University of Dunaujvaros, Dunaujvaros, Hungary*

*John Von Neumann University, Kecskemet, Hungary*

*Budapest Business University, Budapest, Hungary*

## **The Reliability of Information Sources: Student Perceptions and Educational Opportunities**

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**Anita Mihalovicsne Kollar**

*University of Dunaujvaros, Dunaujvaros, Hungary*

**Jozsef Katona**

*Obuda University, Budapest, Hungary*

*University of Dunaujvaros, Dunaujvaros, Hungary*

*John Von Neumann University, Kecskemet, Hungary*

*Budapest Business University, Budapest, Hungary*

## **The Impact of the Digital Transformation of Education on Literacy**

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**Imre Farkas\***, **Attila Kovari\*\***, **Mónika Rajcsanyi-Molnar\***

*\* University of Dunaujvaros, Dunaujvaros, Hungary*

*\*\* Eszterházy Károly Catholic University, Eger, Hungary*

*Obuda University, Budapest, Hungary*

*John Von Neumann University, Kecskemét, Hungary*

## **Studying The Effect of Photon Wavelength on Solar Cell Efficiency**

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**Ahmed Issa Alnahhal**, **Balázs Plesz**

*Budapest University of Technology and Economics, Budapest, Hungary*

## **The Emergence of Artificial Intelligence in Education and its Impact on Individual Literacy in Higher Education**

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**Imre Farkas\***, **Attila Kovari\*\***, **Mónika Rajcsanyi-Molnar\***

*\* University of Dunaujvaros, Dunaujvaros, Hungary*

*\*\* Eszterházy Károly Catholic University, Eger, Hungary*

*Obuda University, Budapest, Hungary*

*John Von Neumann University, Kecskemét, Hungary*

## **Transformative Applications and Key Challenges of Generative AI**

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**Attila Kovari**

*Obuda University, Budapest, Hungary*

*Eszterházy Károly Catholic University, Eger, Hungary*

*University of Dunaújváros, Dunaujvaros, Hungary*

*John Von Neumann University, Kecskemét, Hungary*

**Jozsef Katona**

*Obuda University, Budapest, Hungary*

*University of Dunaujvaros, Dunaujvaros, Hungary*

*John Von Neumann University, Kecskemét, Hungary*

*Budapest Business University, Budapest, Hungary*

## **Student Perceptions of AI-Enhanced Adaptive Learning Systems: A Pilot Survey**

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**Klara Ida Katonane Gyonyoru**

*University of Dunaujvaros, Dunaujvaros, Hungary*

**Jozsef Katona**

*Obuda University, Budapest, Hungary*

*University of Dunaujvaros, Dunaujvaros, Hungary*

*John Von Neumann University, Kecskemet, Hungary*

*Budapest Business University, Budapest, Hungary*

## **Effects of Arch Support Pads and Insoles on Gait Parameters and Plantar Mechanics during Running in Adults with Flatfoot**

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**Hairong Chen, Qiaolin Zhang, István Bíró**

*Óbuda University, Budapest, Hungary*

## **Advanced Digital and Artificial Intelligence-based Solutions for Interactive, Collaborative Learning Support**

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**Enikő Nagy, David Sik**

*Óbuda University, Budapest, Hungary*

**Zoltan Biczo, Krisztina Zimányi**

*University of Gábor Dénes, Budapest, Hungary*

**Gábor Pörzse**

*Semmelweis University, Budapest, Hungary*

**György Molnár**

*Óbuda University, Budapest, Hungary*

*Széchenyi University, Győr, Hungary*

## **The Transformation of Digital Culture and Learning Habits in Higher Education, Digital Methods and Tools**

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**József Cserkó\*, Mónika Rajcsányi-Molnár\*\*, István András\*\*,  
Anikó Benyák\*, Attila Pongrácz\*, György Molnár\*, \*\*\***

*\* Széchenyi University Győr, Hungary*

*\*\* University of Dunaújváros, Dunaújváros, Hungary*

*\*\*\* Óbuda University Budapest, Hungary*

## **Investigation of Different of Arrangement of Halbach Array**

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**Sándor Nagy, Sándor Semperger**

*Óbuda University, Budapest, Hungary*



**13:00 – 14:20**     **[T1a] Session on Power Systems, Energy Efficiency I**  
(Room I. 122)

Session Chairs: **György Molnár, Zsolt Conka**  
Secretary: **Tamás Tóth**

**13:00**     **Geographic Optimization of Vertical Farm Installation using Drone Delivery Transport Method in Budapest**

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**György Ágoston, Haytam Aydane, Antal Joós**  
*University of Dunaújváros, Dunaújváros, Hungary*

**13:30**     **The Heat of Alloy Formation Determined from XPS and TDS Measurements**

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**Imre Kovács**  
*University of Dunaújváros, Dunaújváros, Hungary*

**14:00**     **Laboratory Demonstration of UPQC System**

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**Zaid H. Ali\***, \*\*, **Dávid Raisz\***  
*\* Budapest University of Technology and Economics, Budapest, Hungary*  
*\*\* Technical Institute/Hawija, Northern Technical University, Iraq*

**14:20 – 14:40**     **Coffee break**

**14:40 – 16:20**    **[T1b] Session on Power Systems, Energy Efficiency II**  
(Room I. 122)

Session Chair: **György Molnár, Zsolt Conka**  
Secretary: **Tamás Tóth**

**14:40**    **Analysis of the Stability of the Shaft Coupling of Three-Phase Asynchronous Motors from a Diagnostic Approach**

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**István Bendiák, Sándor Semperger**  
*Óbuda University, Budapest, Hungary*

**15:00**    **Automated Extraction, Simulation, and Smoothing of Load Diagrams in Power Systems using JSON Data**

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**Marek Bobček, Robert Stefko**  
*Technical University of Košice, Košice, Slovakia*

**Zsolt Conka, Péter Kádár**  
*Óbuda University, Budapest, Hungary*

**Asghar Aamer Bilal**  
*COMSATS Institute of Information Technology Lahore, Lahore, Pakistan*

**Marek Miltner**  
*Czech Technical University in Prague Prague, Czech Republic;  
Stanford University, Stanford, United States of America*

**15:20**    **Examination of Gear Change Transients of a Twin Synchronous Motor Drive Fitted to a Gear Unit with a Common Output Shaft**

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**István Bendiák, Tamás Sándor**  
*Óbuda University, Budapest, Hungary*

15:40 **Longitudinal Impedance Calculation Method for Cable Lines  
with Single-Core High Voltage Cables**

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**Mikhail Dimitriev**

*LLP "PolymerEnergy" Technical department, Astana, Qazaqstan*

**György Morva, Péter Kádár**

*Óbuda University, Budapest, Hungary*

16:00 **A Reduction Technique of Electromagnetic Noise Generated by  
Three-Phase Power Electronic Converters**

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**Mircea Buzdugan**

*Technical University of Cluj-Napoca, Cluj-Napoca, Romania*

**13:00 – 14:40**     **[T2a] Session on Digital Transformation for Education** (Room II. 208)

Session Chairs: **Tibor Guzsvinecz, József Katona**  
Secretary: **David Sik**

**13:00**     **The Role and Impact of Digital Transformation in the Development of Professional Teachers' Methodological Culture**

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**László Kadocsa, Levente Juhász, Gyula Gubán**  
*University of Dunaújváros, Dunaújváros, Hungary*  
**György Molnár**  
*Óbuda University, Budapest, Hungary*  
*Széchenyi University, Győr, Hungary*

**13:20**     **Electricity Laboratory Course Modernisation**

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**Gergő Juhász**  
*Óbuda University, Budapest, Hungary*

**13:40**     **AVATAR – A Digital Tool for Reducing Dropout Rates at a Higher Education Institution**

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**Mónika Rajcsányi-Molnár, László Balázs, István András, Sándor Czifra**  
*University of Dunaújváros, Dunaújváros, Hungary*

**14:00**     **Large Language Models, Fine Tuning, Code Generation**

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**Levente Zsolt Juhász**  
*University of Dunaújváros, Dunaújváros, Hungary*

**14:20**     **Opinions on the Need for Digital and Pedagogical Competences in Vocational Training - Lessons from an Empirical Study**

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**Anetta Bacsa-Bán, Sándor Kolacsek**  
*University of Dunaújváros, Dunaújváros, Hungary*

**14:20 – 15:00**     **Coffee break**

**15:00 – 16:40**      **[T2b] Special Session on Collaborative Robots and Systems**  
(Room II. 208)

Session Chairs: **Róbert Szabolcsi, Tibor Wühl**  
Secretary: **Döniz Borsos**

**15:00**      **Conceptual Design of a UAV-UGV Autonomous Collaborative Robot System**

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**Róbert Szabolcsi, György Molnár, Tibor Wühl**  
*Óbuda University, Budapest, Hungary*

**15:20**      **On the Connectivity Model Management of Industrial IoT Devices**

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**Géza Szabó\*, Marcell Balogh\*,\*\*, Ádám Szanyi\*\*, Dániel Bata\*\*, Attila Vidács\*\*, István Komlósi\*\*\*, Tamás Pepó\*\*\***  
*\* Ericsson Hungary Ltd., Budapest, Hungary*  
*\*\* KUKA Hungary Ltd, Hungary*  
*\*\*\* Budapest University of Technology and Economics, Hungary*

**15:40**      **Remote Manufacturing in Untrusted Domains**

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**Károly Kecskeméti\*,\*\*, Csaba Györgyi\*\*, Géza Szabó\*, Péter Vörös\*\*, Sándor Laki\*\*, Mátyás Andó\*\*, István Komlósi\*\*\*, Tamás Pepó\*\*\***  
*\* Ericsson Hungary Ltd., Budapest, Hungary*  
*\*\* ELTE Eötvös Loránd University, Budapest, Hungary*  
*\*\*\* KUKA Hungary Ltd, Hungary*

16:00 **Defining User Coordinate Systems for Industrial Robots in Mixed Reality**

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**Zoltán Szilágyi\***, **Csaba Hajdu\*\***, **Ákos Soós\*\*\***, **Károly Széll\***,  
**Péter Galambos\***

\* *Óbuda University, Hungary*

\*\* *University of Győr, Győr, Hungary*

\*\*\* *VELUX Magyarország Kft., Fertőd, Hungary*

16:20 **Tool Condition Monitoring in High-Speed Machining: Techniques and Trends**

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**Junaid Israr, Döníz Borsos**

*Óbuda University, Budapest, Hungary*

**18:00** **Gala Dinner**

**Location: Trófea Zugló**

Address: Erzsébet királyné útja 5-7, H-1145 Budapest, Hungary

# October 18, Friday

**10:00 – 12:00**    **[F1a] Session on Smart Cities and Energy Communities, Nearly Zero Energy Buildings**

(Room I. 122)

Session Chairs: Péter János Varga, György Molnár

Secretary: Virág Becsó

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**10:00**    **Load-Flow Model Optimized for the Solar Capacity of Cities**

**József Bencsik, Virág Becsó**

*Óbuda University, Budapest, Hungary*

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**10:20**    **A Black Box Approach to Air Source Heat Pump Power Output Modelling**

**Jonadri Bundo, Denis Panxhi, Donald Selmanaj**

*Polytechnic University of Tirana, Tirana, Albania*

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**10:40**    **Creating a Hyperledger Fabric Network Blockchain to Securely Store Sensitive Renewable Energy Management Data**

**Krisztián Bálint**

*Óbuda University, Budapest, Hungary*

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**11:00**    **Analysis of Driving Behaviour in Adverse Weather Conditions**

**Jamal Raiyn, Mohamad Mofeed Chaar, Galia Weidl**

*University of Applied Sciences, Aschaffenburg, Germany*

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**11:20**    **Exploiting Geothermal Energy for Renewable Energy Communities in Italy**

**Jessica Maria Chicco, Giuseppe Mandrone**

*University of Turin, Torino, Italy*

**Valerio Morando, Guglielmina Mutani**

*Politecnico di Torino, Torino, Italy*

11:40 **Developing a Top-down Statistical Urban Building Energy Model for Space Heating in Mendoza, Argentina**

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**Guglielmina Mutani, Mahmoud Ghanipour,  
Ghazale Zabetitarghi**

*Politecnico di Torino, Torino, Italy*

**Mariela Edith Arboit**

*National council of scientific and technical research, Mendoza,  
Argentina*



**12:00 – 13:00**    **[F2a] Session on IoT, CPS, Big Data, Artificial Intelligence** (Room I. 122)  
Session Chairs: **Rajmund Drenyovszki, Jozsef Katona**  
Secretary: **Márk Baross**

**12:00**    **Categorization of IoT and IIoT systems**

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**Baross Márk Tamás, Péter János Varga**  
*Óbuda University, Budapest, Hungary*

**12:20**    **A Comparative Analysis of Digital Twins for Advanced Networks**

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**Urwah Muslim and Stephan Recker**  
*University of Applied Sciences and Arts, Dortmund, Germany*

**12:40**    **Security Enhancement of IoT with the Cybersecurity Act**

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**Roland Nagy, Kristóf Stölczer, Tamás Szádeczky**  
*Óbuda University, Budapest, Hungary*

**13:00 – 13:40**    **[F3a] Session on Computer Systems for Healthcare and Medicine, Data Acquisition Systems** (Room I. 122)  
Session Chair: **Sándor Gyányi**  
Secretary: **Gergő Sebestyén**

**13:00**    **MAIDScan, a New Acoustic 2D and 3D Flaw Detection System**

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**Gabor Por**

*University of Dunaújváros, Dunaújvaros, Hungary*

**13:20**    **Classification of Drones in Disaster Management**

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**Péter Miksa Hell, Péter János Varga**

*Óbuda University, Budapest, Hungary*

**14:00 – 15:00**    **Lunch and Closing Ceremony**

**16:00**    **Visiting MOL Campus (optional)**

**10:00 – 11:00**      **[F1b] Session on Digital Transformation for Education** (Room II. 207)

Session Chairs: **Bálint Nagy, József Katona**  
Secretary: **Attila Mészáros**

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**10:00**      **Development of a Virtual Reality Application for Neck Exercises**

**Domonkos Kertesz, Judit Szűcs, Tibor Guzsvinecz**  
*University of Pannonia, Zalaegerszeg, Hungary*

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**10:20**      **On Some Methods of Digital Assessment for Mathematical Courses**

**Anna Mária Takács, Anna Takács, Dániel Gyula Augusztinyi, Bálint Nagy**  
\* *Budapest Business University, Budapest, Hungary*  
\*\* *University of Dunaújváros, Dunaújváros, Hungary*  
\*\*\* *Óbuda University, Budapest, Hungary*

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**10:40**      **The relationship between attention, memory and pupillometry**

**Regina Nádas**  
*Eötvös Loránd University, Budapest, Hungary*  
**György Molnár**  
*Óbuda University, Budapest, Hungary*  
*Széchenyi University, Győr, Hungary*

**11:00 – 11:20**      **[F2b] Session on Electrical Materials, Devices and their Applications, Lighting Applications**

(Room II. 207)

Session Chairs: **György Schuster, Zsolt Markella**

Secretary: **Attila Mészáros**

**11:00**      **Characterization of Thermal Behavior of Lead-free SAC305 Solder for Optimal Manufacturing in Soldering Processes**

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**Béla Bódi, Viktor Gonda**

*Óbuda University, Budapest, Hungary*

**11:20 – 12:20**      **[F3b] Session on Embedded Programming, System Controlling, Distributed Systems**      (Room II. 207)

Session Chairs: György Schuster, Zsolt Markella  
Secretary: Attila Mészáros

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**11:20**      **Methodologies Used in Safety-Critical Development**

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**György Schuster**  
*Obuda University, Budapest, Hungary*

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**11:40**      **Acoustic Emission and Sensor Actuation**

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**László Koroknai\*,\*\*, László Kuzsella\***  
*\* University of Miskolc, Miskolc, Hungary*  
*\*\* University of Dunaújváros, Dunaújváros, Hungary*

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**12:00**      **Rotor Position Sensing in Switched Reluctance Motors using Magnetostrictive Amorphous Wire**

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**Jackson Oloo, Laszlo Szamel**  
*Budapest University of Technology and Economics, Budapest, Hungary*

**14:00 – 15:00**      **Lunch and Closing Ceremony**

**16:00**      **Visiting MOL Campus (optional)**