



Ministry of Higher Education and Scientific Research
University of Mouloud Mammeri, Tizi-Ouzou
Faculty of Electrical Engineering and Computer Science



International Conference on Artificial Intelligence,
Embedded Systems, and Renewable Energy

PROGRAM
15-17 December 2023

Day 1 - Opening

Conference Chair: **ZIRMI**

Monday, December 15, 2025 at 8:30 – 9:00 (GMT+1)

Day 1 – Keynote 1

Speaker: **PROF. TEDJANI MESBAHI**

**Smart Battery and Hybrid Energy Storage Systems for Electric Vehicles
and Drones: Advanced Energy Management Strategies and Applications**

Monday, December 15, 2025 at 9:00 – 9:45 (GMT+1)

Day 1 – Coffee Break

Monday, December 15, 2025 at 9:45 – 10:15 (GMT+1)

Day 1 – Keynote 2

Speaker: **DR. HACIB BEN AISSA**

**Energy Transition and Industry Decarbonisation: Emerging Pathways and
Technologies**

Monday, December 15, 2025 at 10:15 – 11:00 (GMT+1)



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PROGRAM
15-17 December 2023

Day 1 - Oral Session 1 - Track 1

Session Chair:

Session Title: **Renewable Energy Innovation, Control, and Optimization**

Monday, December 15, 2025 at 11:00 – 12:00 (GMT+1)
MM_Room01

- 67 **Sustainable Power Generation via Olive Solid Waste Gasification in the Tizi Ouzou Region.**
- 71 **Analysis of Long-Term Performance Degradation in Photovoltaic Modules**
- 77 **Sensorless Voltage-Oriented Control of Modular Multilevel Converters for Wind Power Systems**
- 130 **Improved Funnell Control Strategy with PI Regulation for Wind Energy Systems for Maximum Power Point Tracking**

Day 1 - Oral Session 1 - Track 5

Session Chair:

Session Title: **Advanced Control, Optimization, and Sustainable Technologies for Renewable Energy Systems**

Monday, December 15, 2025 at 11:00 – 12:00 (GMT+1)
MM_Room02

- 33 **Solar Inverter Performance Prediction Using Double Exponential Curve Fitting**
- 44 **Robust Generalized Predictive Speed with Direct Torque Control for Multiphase Wind Generators under Parametric Uncertainty**
- 58 **Energy-Efficient and Sustainable Approaches to AS/RS Design and Control: A Comprehensive Review**
- 97 **Equivalent Consumption Minimization Strategy for Energy Management in Unmanned Aerial Vehicle**



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PROGRAM
15-17 December 2023

Day 1 - Oral Session 1 - Track 6

Session Chair:

Session Title: **AI-Driven Automation and Robotics for Precision Agriculture**

Monday, December 15, 2025 at 11:00 – 12:00 (GMT+1)
MM_Room03

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|-----|-----------------------------------------------------------------------------------------------------|
| 92 | Using a UAV Crop Monitoring System for Early Tomato Disease Detection and Decision Support |
| 105 | Sensor-Driven Real-Time Obstacle Detection for Agricultural Drone Spraying Systems |
| 112 | Fruit Anomaly Detection and Manipulation Using a Vision-Guided Autonomous Aerial Manipulator |

Day 1 – Lunch Break

Monday, December 15, 2025 at 12:00 – 13:00 (GMT+1)

Day 1 – Keynote 3

Speaker: **MR. DANIEL COOK**

Energy Management and Storage with Bio-Based Phase Change Materials

Monday, December 15, 2025 at 13:00 – 13:45 (GMT+1)



PROGRAM
15-17 December 2023

Day 1 - Oral Session 2 - Track 1

Session Chair:

Session Title: **Innovations in Renewable Energy Conversion, Optimization, and Integration**

Monday, December 15, 2025 at 13:45 – 14:45 (GMT+1)
MM_Room01

- 27 **Performance and Emission Analysis of LPG-Hydrogen Dual Fuel Engines**
- 55 **Comparative Study of the Different Structures of Multi-Level Inverters for the Connection of PV Systems to the Power Grid**
- 83 **Hippopotamus Optimization Algorithm-Based Robust Tilt-FOID Control Design for Linear Time-Invariant Systems in Renewable Energy Applications**
- 107 **Coupled Magneto-Mechanical Modeling of a Marine Wave Energy Recovery System**

Day 1 - Oral Session 2 - Track 5

Session Chair:

Session Title: **Advanced Forecasting, Control, and Energy Harvesting**

Monday, December 15, 2025 at 13:45 – 14:45 (GMT+1)
MM_Room02

- 138 **Design and Development of a Piezoelectric Shoe Using Lead-Free Composite Materials for Mechanical Energy Harvesting**
- 140 **Energy Management of a Smart District Using the Neural Predictions and Predictive Control Model (MPC)**
- 173 **Enhanced Battery Health Forecasting with Dynamic Thresholds Using Multi Input LSTM Networks**
- 185 **Predictive Control of DFIG in a Hybrid PV/DFIG/Batt System Supplying a Water Pumping System**



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PROGRAM
15-17 December 2023

Day 1 - Oral Session 2 - Track 6

Session Chair:

Session Title: **Intelligent Sensing and Prediction for Agricultural Systems**

Monday, December 15, 2025 at 13:45 – 14:45 (GMT+1)

MM_Room03

- 134 **Prediction of a Tunnel Greenhouse Relative Humidity Using Artificial Neural Network**
- 161 **Review of Smart Systems in Aquaculture and Aquaponics**
- 178 **Comparative Analysis of YOLOv8, YOLOv11, and Faster R-CNN for Multi-Crop Plant Disease Detection**



PROGRAM
15-17 December 2023

Day 1 - Poster Session

Session Chair:

Session Title: **Smart Energy, Machine Learning, and Power Materials Reliability**

Monday, December 15, 2025 at 14:45 – 15:30 (GMT+1)

MM_Hall

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|-----|--------------------------------------------------------------------------------------------------------------------------------------------|
| 72 | Smart Energy Control in PV-Battery Systems Using Three-Level Boost Converters with DC-Link Voltage Regulation via Genetic Algorithm |
| 85 | Bio-Inspired Method for Optimal Energy Management and Efficiency Improvement of Microgrids |
| 131 | Thermal Aging Effects on the Electrical, Mechanical and Physicochemical Properties of LDPE Power Cables Insulation |
| 142 | Comparative Numerical Study of Multilayer Walls with and without Phase Change Materials for Enhanced Thermal Performance |
| 146 | Design and Implementation of a Modular Cold Storage System |
| 151 | Performance Assessment of ANN and MLR Models for Predicting NF/RO Desalination System |
| 163 | Heart Beat IoT: Real-Time Cardiac Monitoring |
| 177 | Effect of Critical Current Density Dependence on the Internal Magnetic Field Penetration in an HTC Superconducting Bulk |
| 183 | Machine Learning for Predictive Maintenance of Electrical Machines: A Review |
| 184 | Hydrothermal Degradation Impacts on the Properties Of PVC Cables Insulation |
| 191 | Ultraviolet Aging Effects on the Dielectric Properties of PVC/Al_2O_3 Nanocomposites Cables Insulation |



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PROGRAM
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Day 1 - Online Session - Track 1

Session Chair:

Session Title: **Advanced Renewable Energy Systems: Design, Monitoring, and Control**

Monday, December 15, 2025 at 15:30 – 17:30 (GMT+1)
MM_Room01

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|-----|------------------------------------------------------------------------------------------------------------------------------|
| 136 | Study and Development of Methodology for Dimensioning Photovoltaic Systems (PVS) |
| 153 | Daily Energy Production Patterns in Medium-Scale Hydroelectric Operations: a Longitudinal Descriptive Study |
| 156 | Design and Implementation of a Low-Cost Automatic Weather Station Based on the Internet of Things |
| 158 | From Grid Following to Grid Forming in PV Grid Tied Single Phase Inverter |
| 167 | Overshoot-Free Speed Control in PMSG Wind Turbines Using a Smooth Sliding Mode Controller |
| 186 | Seasonal Variability and Performance Optimization of Wind Power Generation: A Comprehensive Study of ENGIE Operations |



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PROGRAM
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Day 1 - Online Session - Track 5

Session Chair:

Session Title: **Metaheuristic Optimization and Control Strategies for Hybrid Systems**

Monday, December 15, 2025 at 15:30 – 17:30 (GMT+1)
MM_Room02

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|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| 28 | PSO Algorithm for Optimal of Fuzzy Logic Controller for A DC-DC Buck Converter |
| 64 | Two-Level Hierarchical Control of a PV-Battery Hybrid Energy System Using Differential Flatness-Based Strategy and MShOA-Tuned FOPID Controller |
| 73 | Comparative Optimal Dispatch Control Strategies for a Hybrid Renewable Energy System |
| 115 | Energy Management of a PEMFC/Battery Electric Vehicle Using a State Machine Strategy |
| 149 | Optimization of Energy Management in a PV–Wind–Battery Microgrid Using PSO in MATLAB |
| 154 | Statistical Assessment of Commercial Electric Service Quality: A Case Study of ENEL Distribution Company in Peru |
| 162 | Optimal Distribution Network Reconfiguration for Minimizing Energy Losses and Enhancing Reliability Using Metaheuristics |



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PROGRAM
15-17 December 2023

Day 1 - Online Session - Track 6

Session Chair:

Session Title: **Machine Intelligence and Sensing Technologies for Precision Agriculture and Water Management**

Monday, December 15, 2025 at 15:30 – 17:30 (GMT+1)
MM_Room03

- 30 **Hybrid WCA-HS Based Control for Autonomous Quadrotor Navigation in Precision Agriculture**
- 40 **Advancing Infiltration Modeling with Deep Learning: A Superior Alternative to Empirical Approaches in the Mitidja Plain**
- 91 **Advancing Agricultural Robotics: AI Control Strategies for Delta Robots**
- 98 **Early-Season Water Use Patterns in Wheat and Barley under Semi-Arid Conditions: A Lysimetric Approach**
- 147 **IoT-Based Climatic Environment Monitoring System Design for a Cattle Breeding Buildings**
- 157 **Integrated Geophysical Approach for Groundwater Prospecting**



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PROGRAM
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Day 2 – Keynote 1

Speaker: **PROF. HAMID LAGA**

Efficient Deep Learning for 3D/4D Shape Analysis: From Medical Applications to Generative AI

Tuesday, December 16, 2025 at 9:00 – 9:45 (GMT+1)

Day 2 – Coffee Break

Tuesday, December 16, 2025 at 9:45 – 10:15 (GMT+1)

Day 2 – Keynote 2

Speaker: **PROF. FREDE BLAABJERG**

Challenges of Renewable Energy Integration in Clean Energy Systems

Tuesday, December 16, 2025 at 10:15 – 11:00 (GMT+1)



PROGRAM
15-17 December 2023

Day 2 - Oral Session 1 - Track 1

Session Chair:

Session Title: **Advanced Photovoltaic Materials and Solar Forecasting**

Tuesday, December 16, 2025 at 11:00 – 12:00 (GMT+1)

MM_Room01

- 22 **Comparative Analysis of Pure ZnO, Ag-Mn Codoped ZnO, and Mn:ZnO/Ag/Mn:ZnO Multilayer Transparent Conductive Oxides for Photovoltaic Applications**
- 41 **Characterization of EVA/phase change material blend embedded with zinc oxide (ZnO) nanomaterial as nanocomposite for photovoltaic module encapsulation process**
- 70 **Surpassing 16% Efficiency in Cd-Free CZTS Solar Cells via Si Back-Contact Engineering and IR Harvesting**
- 171 **A Hybrid Electrical and Environmental LSTM Approach for Short-Term Solar Power Forecasting in Algeria**

Day 2 - Oral Session 1 - Track 2

Session Chair:

Session Title: **Edge AI and Intelligent Monitoring for Energy Systems**

Tuesday, December 16, 2025 at 11:00 – 12:00 (GMT+1)

MM_Room02

- 26 **Recent Advances in the Application of TinyML and Edge Devices in Solar Photovoltaic Systems: Bridging the Gap Between Laboratory Research and Industry**
- 49 **An Embedded AI Model for Defect Detection in Photovoltaic Modules Using a Jetson Nano-Powered Unmanned Aerial Vehicle**
- 125 **Unbalance fault detection in an IoT-Connected Motor Network Using Artificial Neural Networks**



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PROGRAM
15-17 December 2023

Day 2 - Oral Session 1 - Track 3&4

Session Chair:

Session Title: **Data-Driven Modeling and Optimization in Power Systems**

Tuesday, December 16, 2025 at 11:00 – 12:00 (GMT+1)

MM_Room03

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|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 36 | Advanced Polynomial and Gaussian Regression Frameworks for Predictive Modeling of Tangential Discharge Phenomena in High-Voltage Insulation Systems |
| 80 | Data-Driven Based Sparse Identification of Nonlinear Dynamics for Stability Analysis of Mixed Grid-Following and Grid-Forming Inverters |
| 121 | Formal Concept Analysis for Knowledge Extraction and Optimal Configuration Selection in Photovoltaic Installations |
| 170 | Study of a Hybrid PV/Fuel Cell System Dedicated to an Electric Vehicle Charging Station |

Day 2 – Lunch Break

Tuesday, December 16, 2025 at 12:00 – 13:00 (GMT+1)

Day 2 – Keynote 3

Speaker: **DR. KAMAL HADIDI**

Innovating Chemical Manufacturing: Low-Temperature Solutions for Energy Efficiency and Emissions Reduction

Tuesday, December 16, 2025 at 13:00 – 13:45 (GMT+1)



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PROGRAM
15-17 December 2023

Day 2 - Oral Session 2 - Track 1

Session Chair:

Session Title: **Intelligent Control and Fault Diagnosis in Photovoltaic Systems**

Tuesday, December 16, 2025 at 13:45 – 14:45 (GMT+1)

MM_Room01

- 59 **A Novel Linguistic Hedge-Based Fuzzy Logic Controller for Enhanced MPPT in PV Systems**
- 61 **Tuning of a Neutrosophic Fuzzy Controller for DC Motor Using the Novel Qudwa Metaheuristic**
- 87 **Experimental Study of Solar Water Pump Control by Arduino**
- 93 **Open-Circuit Fault Diagnosis of a Three-Level Boost Converter for Photovoltaic Applications**

Day 2 - Oral Session 2 - Track 2

Session Chair:

Session Title: **Control and Security in Modern Renewable Energy Systems**

Tuesday, December 16, 2025 at 13:45 – 14:45 (GMT+1)

MM_Room02

- 53 **Security of Grid-Connected Photovoltaic Plants A Mini-Review and Future Directions**
- 141 **Direct Power Control Technique for Wind Power Generation System based on a Double Stator Induction Generator (DSIG)**
- 190 **Development and Design of an Intelligent Energy Router**



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PROGRAM
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Day 2 - Oral Session 2 - Track 3&4

Session Chair:

Session Title: **Intelligent Control and Optimization in Renewable Energy Systems**

Tuesday, December 16, 2025 at 13:45 – 14:45 (GMT+1)

MM_Room03

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|-----|----------------------------------------------------------------------------------------------------------------|
| 123 | Improving the Performance of a Wind Turbine PID Controller Using GWO Optimization and Fuzzy Logic |
| 128 | Stabilizing Photovoltaic Output Using a Controlled Ćuk Converter Topology |
| 188 | Anomaly Detection in Datacenter Energy Consumption Using an Autoencoder |
| 194 | Optimizing Batteries Charging Time Inside an Autonomous Photovoltaic System Installed on a House's Roof |



PROGRAM
15-17 December 2023

Day 2 - Poster Session

Session Chair:

Session Title: **Smart Sensing, and Intelligent Control in Energy and IoT Systems**

Tuesday, December 16, 2025 at 14:45 – 15:30 (GMT+1)

MM_Hall

- 38 **Determination of the Minimum Capacitance for Self-Excitation of a SEIG, Taking Into Account the Speed Ramp Up**
- 57 **Comparative Analysis of MPPT Algorithms for Photovoltaic Systems Under Partial Shading: A MATLAB/Simscape-Based Study**
- 90 **Transformer Fault Diagnosis Using HHO-Enhanced XGBoost and Liquid Dielectric Signal Analysis**
- 110 **Graph-Based Semi-Supervised Learning for Fault Clustering in Grid-connected PV Systems**
- 114 **Detection of Silicone Oil Concentration Using a Two-Dimensional Photonic Crystal Sensor**
- 120 **AI-Enabled Wearable IoT Device for Facial Recognition in Student Transportation Systems**
- 135 **Dynamic Performance Evaluation of a Dual-Star Induction Machine Fed by an Indirect Matrix Converter**
- 159 **A Low-Cost and Eco-Friendly Humidity Sensor Based on Keratin Thin Film**
- 172 **Wearable Low-Energy RFID-Integrated Vibration Tag for Silent, Long-Term Sleep Apnea Monitoring and Posture Sensing**
- 175 **Low Power Energy and Real-Time Localization of Prisoners Inside Correctional Facilities Using Inertial Sensors and Particle Filtering: A Dead Reckoning Approach**



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PROGRAM
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Day 2 - Online Session - Track 1

Session Chair:

Session Title: **Innovations and Optimization in Wind, Solar, and Hybrid Renewable Systems**

Tuesday, December 16, 2025 at 15:30 – 17:30 (GMT+1)
MM_Room01

- | | |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------|
| 68 | A Heuristic Optimization Approach for Wind Turbine Dimensions to Enhance Energy Capture and Reduce Costs |
| 75 | Advancements in Solar Energy Systems: Innovations in Photovoltaic (PV) and Floating PV Technologies for Decentralized Energy Production |
| 103 | Current Sensor Fault Diagnosis of Wind Power System Based on DFIG |
| 106 | Cold plasma-Based Methane Dry Reforming for Hydrogen Production |
| 122 | Recent Advancements in Energy Management for Hybrid Renewable Energy Systems |
| 152 | Renewable Energy Deployment Efficiency: Analyzing Algeria's Achievement Gap and Optimization Strategies |



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PROGRAM
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Day 2 - Online Session - Track 2

Session Chair:

Session Title: **Advanced Control and Modeling for Wind and PV Energy Systems**

Tuesday, December 16, 2025 at 15:30 – 17:30 (GMT+1)

MM_Room02

- 43 **Real-Time Sensorless Control for PMSG Wind Generators Using Step-by-Step Sliding Mode Observer on STM32**
- 52 **Two Step Ahead Finite Set Predictive Torque Control Using Improved Sliding Mode Control for Three Phase Induction Motor**
- 78 **A Prototype Design of Smart DC Power Device for Solar System Application**
- 117 **Co-Simulation and Modeling of WT-AFPMSG Based on Ansys Software and MATLAB/Simulink for Wind Energy Application**
- 118 **Enhanced Fault-Tolerant Harmonic Compensation in Grid-Connected PV Systems: A Comparative Study of Analog Filters for Cascaded Multilevel Inverter Control**
- 119 **Enhanced Direct Current Control in Grid-Following Inverters Using Open-Loop Synchronization and PR Regulator for Renewable Energy Integration**
- 129 **A Space Vector Modulation Scheme for Five-Phase to Three-Phase Indirect Matrix Converter for a Wind Power Application**



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Day 2 - Online Session - Track 3&4

Session Chair:

Session Title: **Advanced AI, Forecasting, and Control Strategies in Modern Energy Systems**

Tuesday, December 16, 2025 at 15:30 – 17:30 (GMT+1)
MM_Room03

- 31 **Fault Diagnosis of Induction Motors Using Convolutional Neural Networks**
- 101 **Autonomous Photovoltaic/Thermal Solar Solution for Resilient Isolated Habitats**
- 109 **Intelligent Hysteresis Current Control Based on Support Vector Machine for SAPF Integrated PV System Under Nonstationary Harmonics**
- 145 **Forecasting Electrical Outages in Adrar, Algeria: Towards a Smart Energy Management System**
- 155 **A Multidisciplinary Systems Engineering Approach to Hybrid Energy Systems Development**
- 168 **A LADRC-Based Robust Speed Controller for PMSMs in Electric Vehicles With External Disturbance Rejection**
- 182 **Emerging AI Methodologies in the Renewable Energy Ecosystem: Successes, Challenges, and Future Research Directions (v2)**