

# 58th UNIVERSITIES POWER ENGINEERING CONFERENCE 2023

Technological University Dublin, Ireland

30 August to 1 September 2023



## TECHNICAL PROGRAMME

28 August 2023

**Wednesday 30 August 2023, 11:30 - 13:00****Technical Session 1a: Active Distribution Networks****Room: CQ-009****Chair: Prof. Mattia Martinelli (Technical University of Denmark, Denmark)**

- 42 Optimal power exchange of two electric vehicle charging stations with solar-hydrogen-battery storage systems: Lijia Duan (Brunel University London); Chun Sing Lai (Brunel University London)\*; Gareth Taylor (Brunel University); Xin Zhang (University of Sheffield)
- 57 Influence of Remanent Magnetization on the Accuracy of Industry Typical Metering Current Transformers: Michael Freiburg (TH Köln)\*; Christoph Mayrhofer (Ritz Instrument Transformers); Dieter Braisch (Friedrich-Alexander-Universität Erlangen-Nürnberg); Norbert Koch (Redur); Roland Bürger (Senseleq)
- 73 Developing an Adaptive Protection Scheme Towards Promoting the Deployment of Distributed Renewable Sources in Modern Distribution Networks: Operational Simulation Phase: Ayatte Atteya (Robert Gordon University)\*; Dalia Ali (Robert Gordon University); Amany El-Zonkoly (Arab Academy for Science, Technology and Maritime Transport); Hamdy Ashour (Arab Academy for Science and Technology)
- 98 Impact of Profile Orientation and Position on Soil Resistivity Measurement for Earthing Applications: Omar Kherif (Cardiff University)\*; Stephen Robson (Cardiff University); Nouredine HARID (Khalifa University of Science Technology, Emirats Unis); David Thorpe (Kingsmill Industries (UK) Limited); Salah Mousa (Cardiff University); Silvio Stivanello (University of Exeter); A. Manu Haddad (Cardiff University)
- 104 Investigation on the Loss Allocation Properties in Distribution Networks with Distributed Generation: Andrea Mazza (Politecnico di Torino)\*; Soheil Saadatmandi (Politecnico di Torino); Salvador Safina (Politecnico di Torino); Gianfranco Chicco (Politecnico di Torino)
- 138 SLP Optimization-Based Voltage Profile Improvement in Unbalanced Distribution Networks With SOP devices: Mohammed Bamatraf (Istanbul Technical University); Oguzhan Ceylan (Marmara University)\*; Ioana Pisica (Brunel University London); Aydogan Ozdemir (Istanbul Technical University)

**Technical Session 1b: Condition Monitoring and Diagnostics****Room: CQ-010****Chair: Prof Dan Micu (Technical University of Cluj-Napoca, Romania)**

- 26 Development of Real-Time Trouble Shooting Guide for Maintenance Support System Hydropower: uthai Kumthai (Chiang Mai University)\*; Suttichai Premrudeepreechacharn (Chiang Mai University)
- 35 Real-Time Simulation-based continuous Thévenin Impedance Monitoring using Phasor Measurements: Kevin Schäfer (Fraunhofer IOSB)\*; Ilia Hosseini (Fraunhofer IOSB); Stephan Ruhe (Fraunhofer IOSB-AST); Mansour Alramlawi (Fraunhofer IOSB); Steffen Nicolai (Fraunhofer IOSB); Peter Bretschneider (Fraunhofer IOSB)
- 51 Wind Turbine Fault Prediction Based On A Novel Gated Recurrent Neural Network Model: Shuo Zhang (Technological University Dublin)\*
- 55 Open Circuit Fault Diagnosis Technique for Inverter Switches and Gate Drive Malfunction: Chukwuemeka N Ibem (Glasgow Caledonian University)\*
- 85 Long-term Wind Power Forecasting Using Variational Mode Decomposition and Convolutional Neural Network: Danya I Al-Hindawi (Teesside University); Maher Dr Al-greer (Teesside University)\*; Gobind Pillai (Teesside University)
- 133 Correlation between Partial Discharge Parameters measured by UHF, IEC and HFCT methods: Nouredine Harid (Khalifa University of Science Technology, Emirats Unis)\*

**Technical Session 1c: Energy Storage****Room: CQ-020****Chair: Prof Ghanim Putrus (Northumbria University, UK)**

- 50 Investigation of different acidic electrolyser conditions for energy storage and hydrogen production: John P Barton (Loughborough University)\*; Elizabeth Ashton (Loughborough University); Dani Strickland (Loughborough University)
- 74 The Assessment Potential of PV/Wind Powered Hydrostorage Systems in the Desert: Case of Algriffa City, Libya: Farag S Alargt (The Centre for Solar Energy Research and Studies)\*; Ahmed Said Ashur (EE Dept. University of Tripoli); Ahmad Kharaz (The School of Engineering and Technology, University of Derby)
- 82 Battery Energy Comparison With and Without a Balancing Circuit using Ragone Theory: Jingxi Yang (Loughborough University)\*
- 89 Sector-Coupled Distribution Grid Analysis for Centralized and Decentralized Energy Optimization: Felicitas Müller (KIT - Karlsruher Institut für Technologie)\*; Steven M de Jongh (Karlsruhe Institute of Technology (KIT)); Xuanhao Mu (Karlsruhe Institute of Technology (KIT)); Michael Suriyah (Karlsruhe Institute of Technology (KIT)); Thomas Leibfried (Karlsruhe Institute of Technology (KIT))
- 93 Reliability assessment with distributed energy resources in a medium-voltage network: Francisco G Fabrin (Universidade Federal de Santa Maria)\*; Daniel Bernardon (Universidade Federal de Santa Maria); Vinicius J Garcia (Federal University of Santa Maria)
- 100 Optimizing Electric Vehicle Charging and Discharging with Renewable Energy Sources in a Modified IEEE 14 Bus System: Gillian L Lacey (Teesside University)\*; Md Atiqur Rahman (Teesside University)

## Wednesday 30 August 2023, 14:00 - 15:30

### Technical Session 2a: Data Analytics and AI Applied to Power Systems (1)

Room: CQ-009

Chair: Dr Oguzhan Ceylan (Marmara University, Turkey)

- 24 Computational Platform for Identification of Atypical Billings in Low Voltage Consumer Units in Distribution Companies in Brazil: Focus on Combating Commercial Losses: Douglas B. S. Figueiredo (Neo Domino)\*; Arlan Bettiol (A Vero Domino); Phablo Gomides (Chesp); Renato Medeiros (ELFSM)
- 36 Real-time object detection on high-voltage powerlines using an Unmanned Aerial Vehicle (UAV): Elisavet Bellou (Brunel University London)\*; Ioana Pisica (Brunel University London); Konstantinos Banitsas (Brunel University London)
- 46 Wind Power Generation Forecast using Artificial Intelligence Techniques: Talal Alazemi (Brunel University)\*; Mohamed Darwish (Brunel University); Maysam Abbod (Brunel University London)
- 67 Artificial Intelligence-based Optimised Energy Management System for Microgrids: Muhammad Majid Hussain (University of South Wales)\*; Mian Hammad Nazir (University of South Wales); Muhammad Naveed Akhtar (Rachna College of Engineering & Technology); Waqas Javed (University of Glasgow); Abdul Razaq (Abertay University); Ahmad Hesham Pasha (University of SouthWales)
- 70 Automatic High Voltage Data Analysis Tools Using Mathematical Techniques and AI: Iwan L Williams (Cardiff University)\*; Maurizio Albano (Cardiff University)
- 78 A Coherency Identification Approach for Low-Inertia Power Systems: Bwandakassy Elenga Banningobera (Norwegian University of Science and Technology (NTNU))\*

### Technical Session 2b: Smart Grids

Room: CQ-010

Chair: Dr Malabika Basu (Technological University Dublin, Ireland)

- 34 Energy Management for Building-Integrated Microgrids Using Reinforcement Learning: Christos Athanasiadis (Democritus University of Thrace); Kalliopi Pippi (Democritus University of Thrace); Theofilos Papadopoulos (Democritus University of Thrace)\*; Christos Korkas (Democritus University of Thrace); Christos Tsaknakis (Democritus University of Thrace); Vasiliki Alexopoulou (Democritus University of Thrace); Vassilis C Nikolaidis
- 41 Penetration of distributed generation in Microgrids: characteristics and challenges: Kypros Tillyros (Frederick University)\*; Nicholas G Christofides (Frederick Univeristy); Michael Komodromos (Frederick University)
- 54 Application of Advanced Model Reference Adaptive Control for Bidirectional AC-DC Converters: Muhammad Ahmed Qureshi (Politecnico di Torino); Salvatore Musumeci (Politecnico Torino); Francesco Torelli (Politecnico di Bari); Alberto Reatti (University of Florence); Andrea Mazza (Politecnico di Torino); Gianfranco Chicco (Politecnico di Torino)\*
- 91 A Novel Energy Balancing Considering Periodic Behavior Pattern of Power System: Saher Javaid (Japan Advanced Institute of Science and Technology)\*; Mineo Kaneko (JAIST); Yasuo Tan (JAIST)
- 114 Assessing the Electrical Energy Consumption for Designing and Developing an Energy Management System in an Educational Building in Romania: Timea Farkas (Universitatea Tehnica din Cluj-Napoca)\*; Gianfranco Chicco (Politecnico di Torino); Levente Czumbil (Technical University of Cluj-Napoca); Andrei Ceclan (Technical University of Cluj-Napoca); Alexandru G Berciu (Technical University of Cluj-Napoca); Dan Doru Micu (Technical
- 121 Precision Time Protocol (PTP) using LinuxPTP on Single Board Computers: John B O Raw (Atlantic Technological University)\*; David Laverty (Queen's University Belfast); Daniel McFadden (Atlantic Technological University)

### Technical Session 2c: Load and Generation Forecasting

Room: CQ-020

Chair: Dr Gobind Pillai (Teesside University, UK)

- 39 Synthetic Electricity Consumption Data Generation using Tabular Generative Adversarial Networks: Thet Paing Tun (Brunel University London)\*; Ioana Pisica (Brunel University London)
- 65 Investigating an Ensemble of ARIMA Models for Accurate Short-Term Electricity Demand Forecasting: Daniil Hulak (Brunel University London)\*; Gareth Taylor (Brunel University)
- 75 Quantifying the risk when using single year PV data in South African electricity system models: Christina Auret (Stellenbosch University)\*; Bernard Bekker (Stellenbosch University)
- 76 How will Air Source Heat Pumps affect Electricity Load Profiles in Buildings in Ireland? A data logger used to model electrical energy profiles: Michael McDonald (TU Dublin)\*
- 79 Reliability parameterised distribution grid flexibility aggregation considering renewable uncertainties: Neelotpal Majumdar (Leibniz University of Hannover)\*; Kengkat Prapatsara (Leibniz University of Hannover); Rauan Yermekbayev (Leibniz University of Hannover); Lutz Hofmann (Leibniz University Hannover)
- 106 Power Load Forecasting: A Time-series Multi-step ahead and Multi-model analysis: Aristeidis Mystakidis (International Hellenic University)\*; Aristeidis Mystakidis (Centre for Research and Technology Hellas); Nikolaos Tsalikidis (Centre for Research and Technology Hellas); Paraskevas Koukaras (International Hellenic University); Paraskevas Koukaras (Centre for Research and Technology Hellas,); Christos Tjortjjs (International

**Wednesday 30 August 2023, 16:00 - 17:30****Technical Session 3a: Power Engineering Education****Room: CQ-009****Chair: Dr Jane Courtney (Technological University Dublin, Ireland)**

- 27 Review on Power Electronics Curriculums in Academia and Framework Development: Walid Issa (Sheffield Hallam University); Maher Dr Al-Greer (Teesside University)\*; Faris I Al-Naemi (Sheffield Hallam Univ.); Imran IB Bashir (Teesside University)
- 30 Phasor Diagrams of Symmetrical Components for Vector Space Decomposition Transformation in Symmetrical Nine-Phase Machine: Živa Stare (University of Ljubljana, Faculty of Electrical Engineering)\*; Rastko Fišer (University of Ljubljana, Faculty of Electrical Engineering); Klemen Drobnič (University of Ljubljana, Faculty of Electrical Engineering)
- 53 Analysis of some plotting skills of junior engineering students: Aidan O'Dwyer (TU Dublin)\*
- 90 Developing an adaptive dynamic model of the KSA interconnected national grid: Saad AlQahtani (Cardiff University)\*; Liana Cipcigan (Cardiff University)
- 116 Conversion of Power Flow Models into Real-Time Simulation Models: A Case Study of OpenDSS to Matlab/Simulink Conversion for a Large-Scale Distribution Network: Brian Dowling (University College Cork); Ibrahim Sengor (MaREI SFI Centre, University College Cork)\*; Barry P. Hayes (University of Cork, Ireland)
- 122 PySDDP: An Open-Source Python Tool Applied to the Operation Planning Problem in the Age of Energy Transition: Amanda Pávila Silva (Universidade Federal de Juiz de Fora)\*; André Marcato (Universidade Federal de Juiz de Fora); Alessandro Castro (StudioApp); Diogo Barros (Universidade Federal de Juiz de Fora); Camila Cunha (Universidade Federal de Juiz de Fora)

**Technical Session 3b: Electric Vehicles and e-Mobility (1)****Room CQ:010****Chair: Dr Garret Brady**

- 23 Laboratory validation of electric vehicle smart charging strategies: Anna Malkova (DTU)\*; Simone Striani (DTU); Jan Martin Zepter (DTU); Mattia Marinelli (DTU); Lisa Calearo (Ramboll Danmark A/S)
- 29 A Critical Evaluation of Eco-driving Strategies for Connected Autonomous Electric Vehicles at Signalized Intersections: Xinxing Ren (Brunel University London)\*; Chun Sing Lai (Brunel University London); Gareth Taylor (Brunel University)
- 40 Multi-Agent RL Framework for EV charging scheduling driven by energy costs and user preferences: Christos Korkas (CERTH)\*; Christos Tsaknakis (Democritus University of Thrace); Elias Kosmatopoulos (Democritus University of Thrace)
- 47 A Comparison of PI and RBF Brushless DC Motor Speed Control Methods: Mostafa Farrag (Brunel University London)\*; Chun Sing Lai (Brunel University London); Mohamed Darwish (Brunel University)
- 120 Energy efficiency assesment of sustainable public transport solutions: a comparative analysis fuel cell vs battery in real life scenarios: Dan Doru Micu (Technical University of Cluj-Napoca); Dan Moldovanu (Technical University of Cluj-Napoca)\*

**Technical Session 3c: Renewable Energy Systems (1)****Room: CQ-020****Chair: Prof Eugene Coyle (Technological University Dublin, Ireland)**

- 2 Introduction of Grid Forming Converters in the European Grid Codes: Kyriaki Nefeli Malamaki (Aristotle University of Thessaloniki)\*; Dimitrios Tampakis (Aristotle University of Thessaloniki); Charis Demoulias (Aristotle University of Thessaloniki)
- 7 Performance Evaluation of 1 MW On-grid Solar Photovoltaic Plant with Single Axis Tracker in Muscat, Oman: Mazin A Al-Shidhani (Petroleum Development Oman)\*; Mazin Al-Shidhani (Petroleum Development Oman); Arwa Al Mayasi (Petroleum Development Oman)
- 22 Variable Shunt Reactor Technology to Improve Dynamic Reactive Power Compensation in Wind Farm Power Stations: Seyed Alireza Mousavi Mirkalaei (Hitachi Energy)\*
- 60 Distance Protection of Transmission Lines Connected to Inverter-Based Resources: Michael O'Donovan (Munster Technological University)\*; Noel Barry (MTU); Joe Connell (MTU)
- 61 Capacitive Transfer System Cable for Application in Offshore Microgrids: Edward JS Mair (Enertechnos)\*; Owen Johnson (Enertechnos); Charles Lucas-Clements (Enertechnos); Hafiz Milhan (Enertechnos)
- 64 Analysis of electricity usage for households with electric vehicles and photovoltaics in the UK: Dervla Scully (University College Dublin); Adamantios Bampoulas (University College Dublin)\*; Eleni Mangina (University College Dublin)

**Thursday 31 August 2023, 9:30 - 11:00****Technical Session 4a: Data Analytics and AI Applied to Power Systems (2)****Room: CQ-009****Prof Gianfranco Chicco (Politecnico di Torino, Italy)**

- 88 Graph Algorithms for Topology Identification in Electrical Medium Voltage Grids: Steven M de Jongh (Karlsruhe Institute of Technology (KIT))\*; Felicitas Müller (KIT - Karlsruher Institut für Technologie); Fabian Osterberg (Karlsruhe Institute of Technology (KIT)); Michael Suriyah (Karlsruhe Institute of Technology (KIT)); Thomas Leibfried (Karlsruhe Institute of Technology (KIT))
- 95 On the Impact of Socioeconomic Variables on Non Technical Losses in Low Voltage Distribution Systems: Vinícius J Garcia (Federal University of Santa Maria)\*; Natalia Sousa (Federal University of Santa Maria); Leonardo N. F. da Silva (UFSM); Kamila Kamila (Federal University of Santa Maria); Antônio Kaminski Júnior (Federal University of Santa Maria); Daniel Bernardon (Federal University of Santa Maria); Alzenira Abaide (UFSM);
- 99 Prediction of aggregated EV representation using XGBoost and LightGBM: Marko Kovačević (University of Zagreb, Faculty of Electrical Engineering and Computing)\*; Mario Vasak (Unknown)
- 103 A Markov Chain Model for Imputation of Electricity Consumption Time Series: Jawana Gabrielski (TU Dortmund)\*; Ulf Häger (TU Dortmund)
- 110 Optimization of Maintenance Scheduling for Generator Units in Hydroelectric Power Plants Using Ant Colony Optimization: Elisa Oliveira (Federal University of Juiz de Fora)\*; Marcos Oliveira (Federal University of Juiz de Fora); André Marcato (Federal University of Juiz de Fora); Patrícia Sousa (Federal University of Juiz de Fora); Giovanni Santiago (Santo Antônio Energia); Edimar Oliveira (Federal University of Juiz de Fora)
- 139 Grid Search Based Hyperparameter Optimization for Machine Learning Based Non-Intrusive Load Monitoring: Burak Cem Sayilar (Peakup); Oguzhan Ceylan (Marmara University)\*

**Technical Session 4b: Power System Economics and Electricity Markets****Room: CQ-010****Chair: Dr Keith Sunderland (Technological University Dublin, Ireland)**

- 49 Impact of the National Energy and Climate Plan on the Italian Distribution Networks Infrastructure: Giacomo Viganò (RSE)\*; Marco Rossi (RSE); Diana Moneta (RSE); Chiara Michelangeli (RSE)
- 59 Techno-economic Analysis of Offshore Wind farms Connected to Superconducting MVDC Cables: Cathal Doherty (UCD)\*; Terence O'Donnell (UCD)
- 66 Investigation and Evaluation of the Adoption of Locational Marginal Pricing in Electricity Markets: Muhammad Jamil J Mustapha (Brunel University)\*; Gareth Taylor (Brunel University)
- 105 The Thermal and Optical Characterization of Semi-transparent Photovoltaics Samples for Buildings Energy Evaluations: Haytham Musameh (Sheffield Hallam University); Faris I Al-Naemi (Sheffield Hallam Univ.); Hameed Alrashidi (University of Exeter); Walid Issa (Sheffield Hallam University)\*
- 135 Fair Prosumer Participation in P2P Energy Markets: An Iterative Water-Filling Algorithm for Congestion Control: Emad Jamil (University College Cork)\*; Barry P. Hayes (University of Cork, Ireland)
- 141 Enhance the Effectiveness of Peer-to-Peer Trading in Renewable Energy Community by Innovative Imbalance Price Settlement: Dharmesh Mr Dabhi (Technological University Dublin)\*; Rene Peeren (Technological University Dublin); John Dalton (Technological University Dublin)

**Thursday 31 August 2023, 11:30 - 13:00**

**Technical Session 5a: Power System Modelling and Analysis**

**Room: CQ-009**

**Chair: Dr Stephen Robson (Cardiff University, UK)**

- 48 Design and Optimization of a Hybrid Renewable Energy System for Weizhou Island: Ziyu Fang (University of Edinburgh)\*; Jonathan Shek (University of Edinburgh)
- 81 Inertia Estimation Using the Modal Sensitivity Concept: Validation on Heterogeneous Multi-Machine Power Systems: Achilleas Sfetkos (Aristotle University of Thessaloniki); Eleftherios Kontis (Aristotle University of Thessaloniki); Theofilos Papadopoulos (Democritus University of Thrace); Grigoris K Papagiannis (Aristotle University of Thessaloniki)\*
- 101 DB-TENG Model Development: Seán P O'Connor (TUDublin)\*; Jane Courtney (TU Dublin)
- 107 Unveiling the Potential of Shadow Capacity Analysis for Enhancing Power Grid Loadability: Towards Future Applications: Arash Beiranvand (Technological University Dublin)\*
- 108 Towards the Use of Sink Ancestors and Source Descendants as a Clustering Method in a Directed Acyclic Graph: Justin Ugwu (University College Dublin)\*; Paul Cuffe (University College Dublin)
- 109 Applying a reduced order network simplification method: A South African example: Johannes de Bruyn (Department of Electrical and Electronic Engineering, Stellenbosch University)\*; Bernard Bekker (Stellenbosch University); Amaris Dalton (Stellenbosch University)

**Technical Session 5b: Power Quality**

**Room: CQ-010**

**Chair: Dr Mohammed Elgendy (Newcastle University, UK)**

- 31 DC Measurement in HVAC-Systems: Status Quo and Recent Developments: Philipp Schachinger (Graz University of Technology)\*; Dennis Albert (Graz University of Technology); Alexander Fröhlich (Graz University of Technology); Herwig Renner (Graz University of Technology); Joahannes Mandl (Graz University of Technology); Philipp Trampitsch (Graz University of Technology); Reinhard Klambauer (Graz University of Technology);
- 38 Modeling and Dynamic Simulation of Non-standard Operating Conditions in Low-Voltage Grids Considering Different Network Topologies: Frederik Gielnik (Karlsruhe Institute of Technology)\*; Olga Kinas (Karlsruhe Institute of Technology); Thomas Leibfried (Karlsruhe Institute of Technology)
- 58 Design and Optimal Placement of Static VAR Compensator for Voltage Stability and Power Quality Improvement in Oman's 132 kV Power Grid: Abdullah M Al Shibli (Petroleum Development Oman)\*; Dr. Satish Tanavade (National University of Science and Technology); Saif Al Kalbani (Petroleum Development Oman)
- 83 Wideband Measurement of Grid Impedance using Chirp Signals in Grid-Connected Inverters: Chris Vickery (University College Dublin); Ramy Ali (University College Dublin); Hamed Heydari-Doostabad (University College Dublin)\*; Terence O'Donnell (University College Dublin)
- 92 Frequency Fluctuations in European Isolated Systems: A Review on Standards, Available Recordings and Grid Code Requirements: Johanna Geis-Schroer (Karlsruhe Institute of Technology)\*; Michael Suriyah (Karlsruhe Institute of Technology); Thomas Leibfried (Karlsruhe Institute of Technology)
- 119 Dual-Ćuk High Step-up Bridgeless PFC Converters with Continuous Input and Output Currents: Maryam Pourmahdi-Torghabe (University College Dublin (UCD))\*; Hamed Heydari-Doostabad (University College Dublin); Terence O'Donnell (University College Dublin)

**Friday 1 September 2023, 9:30 - 11:00****Technical Session 6a: Electric Vehicles and e-Mobility (2)****Room: CQ-009****Chair: Dr Alexis Polycarpou (Frederick University, Cyprus)**

- 86 A Power Budget Analysis of an Electrical Uncrewed Air Vehicle (UAV) Flying a Basic Mission Profile: Robert Bolam (Wrexham Glyndwr University); Jhon Roque (Wrexham Glyndwr University); Yuriy Vagapov (Wrexham Glyndwr University)\*; Richard Day (Wrexham Glyndwr University); Mikhail Slepchenkov (TAE Technologies)
- 127 Multiagent-Based Power Flow Control for Plug-and-Play Battery Energy Storages in DC Microgrids: Mudhafar A H Al-Saadi (Teesside University)\*; Michael Short (Teesside University)
- 111 Design, Simulation & Test of an Integrated Powertrain for a low voltage EV: James Millington (University of Derby); Amar Bousbaine (University of Derby)\*; David Wilson (University of Derby)
- 112 Dynamic Characterisation of a Linearised Transfer Function of Non-Ideal Boost Converters: David Wilson (University of Derby); Amar Bousbaine (University of Derby)\*; Bruce Wiggins (University of Derby)
- 43 A Comprehensive Exploration on Different Machine Learning Techniques for State of Charge Estimation of EV Battery: Mohamed Farrag (Glasgow Caledonian University)\*; Mithul Raaj (VIT); Rani Chinnappa Naidu (VIT University); Rajesh Kumar M (Vellore Institute of Technology, Vellore)
- 124 Wireless Power Transfer System for Electric Vehicle Charging with Frequency Hopping – A Concept and Circuit Design: Graham A Blankson (Brunel University London)\*; Mohamed Darwish (Brunel University); Chun Sing Lai (Brunel University London)

**Technical Session 6b: Renewable Energy Systems (2)****Room: CQ-010****Chair: Mr Michael O'Donovan (Munster Technological University, Ireland)**

- 80 An approach to calculate marginal CO<sub>2</sub> emissions factor based on historical emissions: Abbas Rabiee (University College Dublin); Arash Alavi (University College Dublin)\*; Andrew Keane (University College Dublin); John McCann (Sustainable Energy Authority of Ireland (SEAI))
- 94 Analysing the relationship between weather systems and wind resource potential and variability in South Africa: Paulemari E Van Aarde (Stellenbosch University)\*; Amaris Dalton (Stellenbosch University); Bernard Bekker (Stellenbosch University)
- 96 Fostering End Users' Flexibility in Renewable Energy Communities: Riccardo Trevisan (University of Cagliari)\*; Simona Ruggeri (University of Cagliari); Emilio Ghiani (University of Cagliari); Fabrizio Pilo (University of Cagliari)
- 113 Case Study on Energy Storage Using Hydrogen Via Power to Gas Conversion: Ria George (Teesside University)\*; Terry Jermy (The Faraday Centre); G. Lacey (Teesside University); G. P. Pillai (Teesside University)
- 129 Semi-analytical Electro-Thermal Modelling of a Photovoltaic Module for Evaluation of Spatial Temperature Distribution: Aldo Amodio (Università della Basilicata); Antonio D'Angola (Università della Basilicata)\*; Diana Enescu (Valahia University of Targoviste); Antonio Ferraro (University of Basilicata); Gabriele Malgaroli (Politecnico di Torino); Filippo Spertino (Politecnico di Torino)
- 130 The role of Photovoltaic Systems in Reduction of CO<sub>2</sub> Emissions in the UK: A Case Study : Rafiqul Islam Chowdhury (Teesside University)\*

**Technical Session 6c: Transient Analysis and EMTP Modelling****Room: CQ-020****Chair: Prof Grigoris K Papagiannis (Aristotle University of Thessaloniki, Greece)**

- 33 Potential Benefits and Challenges of Employing Inertia Distribution Indexing in RMS Simulations: Stephen J Sommerville (Brunel University)\*; Gareth Taylor (Brunel University); Maysam Abbod (Brunel University London)
- 62 Comparison of Power Cables Current Rating Calculation Methods: Theofilos Papadopoulos (Democritus University of Thrace)\*; Andreas Chrysochos (Hellenic Cables); Michael Fotos (Democritus University of Thrace)
- 68 Analysis of Trapped Charge Effects on Very Fast Transient Overvoltages in 400 kV Gas Insulated Substations: Modelling, Simulation, and Implications for Design and Operation: Mohammed Alhazmi (Cardiff University)\*; Maurizio Albano (Cardiff University); Jonathan James (Cardiff University); A. Manu Haddad (Cardiff University)
- 102 Assessment of Field Data Related to the Lightning Performance of Overhead Lines in the Context of Validating Lightning Performance Estimation Methodologies: Zacharias G Datsios (Aristotle University of Thessaloniki)\*; Alexios Ioannidis (Aristotle University of Thessaloniki); Diamantis Patsalis (Aristotle University of Thessaloniki); Pantelis Mikropoulos (Aristotle University of Thessaloniki); Thomas Tsovilis (Aristotle University of Thessaloniki)
- 115 Design and development of integrated data acquisition system to replace power analyser for power quality measurement and analysis: Paul Howkins (Teesside University); Imran IB Bashir (Teesside University)\*; Maher Dr Al-Greer (Teesside University); Gobind Pillai (Teesside University); Michael Short (Teesside University)
- 125 Implementation of Recorded Lightning Current Waveforms in ATP-EMTP software for Fast-Front Transient Simulations: Zacharias G Datsios (High Voltage Laboratory, Aristotle University of Thessaloniki)\*; Diamantis Patsalis (High Voltage Laboratory, Aristotle University of Thessaloniki); Pantelis Mikropoulos (Aristotle University of Thessaloniki); Thomas Tsovilis (High Voltage Laboratory, Aristotle University of Thessaloniki)

**Friday 1 September 2023, 11:30 - 13:00**

**Technical Session 7a: High Voltage Engineering**

**Room: CQ-009**

**Chair: Dr Theofilos Papadopoulos (Democritus University of Thrace, Greece)**

- 28 Investigation of High Voltage Electrical Cable Loading in Electricity Transformer Substations: Callum D Bergin (UCD)\*; Donal Finn (UCD); Tom Looby (ESB)
- 69 Relative Permittivity of Natural Ester Oil-Based Nanofluids With Iron Oxide Nanoparticles: Evangelos T Staikos (Aristotle University of Thessaloniki)\*; Thomas Tsovilis (Aristotle University of Thessaloniki); Alexandros Hadjicostas (Aristotle University of Thessaloniki); Zacharias G Datsios (Aristotle University of Thessaloniki); George Litsardakis (Aristotle University of Thessaloniki); Eleftheria Pyrgioti (University of Patras);
- 77 Correlation between grounding grid design parameters and safety thresholds in MV/LV networks: Christos Christodoulou (NTUA)\*
- 84 Investigations of Corona Discharge Images for Rod-Rod Electrode System under HVDC: Halil Ibrahim Uckol (Istanbul Technical University)\*; İdris Ozdemir (Istanbul Technical University); Suat İlhan (Istanbul Technical University)
- 118 Electroporation for Water Disinfection: A Proof of Concept Experimentation: Mohamed A Elgenedy (Glasgow Caledonian University)\*; Mohamed Farrag (Glasgow Caledonian University); Jake Simpson (Glasgow Caledonian University)
- 128 Evaluation of Surface Properties of Zinc Borate Filled HTV Silicone Rubber: İdris Ozdemir (Istanbul Technical University)\*; Halil Ibrahim Uckol (Istanbul Technical University); Abdullah Aydogan (Istanbul Technical University); Gurkan Soykan (Bahcesehir University); Refat Ghunem (National Research Council Canada); suat ilhan (Istanbul Technical University)

**Technical Session 7b: Power System Optimisation and Planning**

**Room: CQ-010**

**Chair: Prof Emilio Ghiani (University of Cagliari, Italy)**

- 63 A Data Driven Approach to Enable Proactive Low Voltage Network Development: Pdraig Coughlan (ESB Networks)\*; Emma Silke (ESB Networks)
- 71 Methodology for identification of the optimal structure of hybrid AC DC Microgrids and micro energy hubs: Chrysanthos Charalambous (University of Cyprus)\*; Alexis Polycarpou (Frederick University); Venizelos Efthymiou (FOSS); George E. Georghiou (University of Cyprus)
- 72 Active Power Curtailment-Oriented Operation Strategy for PV Penetrated Distribution Networks: Hilal Ozdemir (Brunel University London)\*; Ioana Pisica (Brunel University London); Aligül Selim Türkoğlu (Yıldız Teknik Üniversitesi)
- 87 Centralized operational cost optimization of a multi-microgrid system using second-order cone programming and power flow tracing: Seyed Ashkan Nejati (Newcastle University)\*; David Greenwood (Newcastle University)
- 126 Using Nonlinear Optimization Solvers to Improve PAR(p) Coefficients Estimation in Synthetic Inflow Scenarios Generation: André Marcato (Federal University of Juiz de Fora); Paulo Correia (RegE Barros Correia Advisers); Vinícius Mr. Kohl (Federal University of Juiz de Fora)\*