



XIII CEI ANNUAL MEETING

WIRELESS POWER TRANSFER

June, 23rd-25th 2021



Program XIII International Annual Meeting CEI

Topics

- Advanced Power Electronic Converters and Systems
- Embedded Intelligence, IoT and Reconfigurable Systems
- Emerging Applications
- Modeling, Characterization and Simulation of Components and Power Converters

Time schedule is Central Europe Summer Time (UTC +2)

Wednesday June 23rd

WORKSHOP

15:00 h.

Impact of SiC & GaN Semiconductors on Power Converters and Architectures: Challenges and opportunities

- Dr. Minjie Chen, Princeton University 15:00 - 15:40 h.
- Prof. Ulrike Grossner, ETH Zurich 15:45 – 16:25 h.
- Dr. Miroslav Vasic, UPM 16:30 – 17:10 h.
- Break (20 minutes)
- Prof. Dragan Maksimovic, University of Colorado Boulder 17:30 – 18:10 h.
- Dr. Juan Rivas, Stanford University 18:15 – 18:55 h.

Thursday June 24th

SHORT COURSES

9:00-12:00 h.

Attendees are invited to attend the following short courses (note that two of them are running in parallel):

- **Key aspects of the design and control of WPT systems**
Coordinators: Regina Ramos & Alberto Delgado
- **Model Predictive Control for Power Converters**
Coordinators: Dionisio Ramírez, Miguel Jiménez Carrizosa & Airán Francés

OPENING SESSION

15:30-16:00 h.

PANEL DEBATE

16:00-18:00 h.

Wireless Power Transfer

- Prof. Regan Zane and Dr. Abhilash Kamineni – Utah State University, USA – *Inductive WPT for Electric Vehicle Applications at the ASPIRE Engineering Research Center*
- Prof. Mor Peretz – Ben-Gurion University, Israel – *Multi-client support with seamless wireless power delivery on distributed Capacitive-coupling medium. Intricate relationships and main challenges*
- Prof. Nuno Borges – Universidade de Aveiro, Portugal – *Radiative RF WPT for IoT applications*

POSTER SESSION

18:00-20:00 h.

The poster session will be held **on line**. You will have the opportunity to discuss with the researchers and to see the latest CEI outcomes.

List of posters net page.

Friday June 25th

TECHNICAL SESSIONS

9:00-14:00 h.

TECHNICAL SESSIONS

9:00-11:15

SESSION CHAIR: [ANDRÉS OTERO](#) / [REGINA RAMOS](#)

Multi-grain Reconfigurable and Scalable Overlays for Hardware Accelerator Composition	R. Zamacola
Dual Active Bridge based Solid State Transformer to Give Support to Railway Grid	D. Santamargarita
Highly automated platform for Real-Time validation of Reconfigurable MPSoC-based space systems	A. Pérez
A Wireless Power Transfer System with Inverse Coupled Current Doubler Rectifier for High Output Current Applications	L. Shi
Automatic data-set generation for deep neural networks training for object classification with LIDAR	C. Wisultschew
Setup for GaN Characterization under Short-circuit Events	J. Galindos

11:30-13:45

SESSION CHAIR: [MIROSLAV VASIC](#) / [ALFONSO RODRÍGUEZ](#)

Post-quantum IoT Security in the extreme edge	J. Señor
Peak and Valley Current Control for Buck type converters	R. Ramos
Affective Computing for Emotion Recognition with wearable Devices	E. Magán
Building Efficient and Low-Profile LLC Converter with Narrow Operating Frequency Range	A. de Juan
Parametric Identification of DC-DC Converters by Means of Optimization Algorithms	H. Mazaheri
Multi-cell Multi-level 20MHz Switching Power Amplifier	L. Gómez

POSTER SESSIONS

The virtual posters are divided in the following 4 topics:

- Advanced Power Electronic Converters and Systems
- Embedded Intelligence, IoT and Reconfigurable Systems
- Emerging Applications
- Modelling, Characterization and Simulation of Components and Power Converters

The virtual poster presentations will be organized in two sessions, with two parallel tracks in each session. For each track there is a unique Zoom link that you can find in the Annual Meeting programme. During the session, each poster will be shortly summarized, clearly explaining the problem that was analysed and the main driver idea that is presented. When the track is finished, the attendees will be able to continue a face-to-face discussion with the presenters going to Zoom breakout rooms that will be organized for each poster. On the web page of the Annual Meeting you can consult all the posters, their distribution per Topic and Session

ADVANCED POWER ELECTRONIC CONVERTERS AND SYSTEMS

Digital control with a low cost MCU of a single phase flyback DCM-PFC	F. Alarcón
Design of a Low Losses Core Inductor for Massive Production	M. Alegre
Floating capacitor based Triple Active Bridge PFC	I. Alzuguren
Single Stage High Efficiency and High Density Bidirectional Rectifier for Telecom	M. Aracil
Optimization, design and validation of the LC filter of a three-phase inverter for electric mobility	M. Astudillo
Design of a SiC Module Driver and DC Bus for a Solid State Transformer	D. Camino
High Density, Isolated AC/DC Converters for EV Fast Charger Applications	L. Clavero
Highly dynamic Close-Loop dv/dt gate driver of a power switch	I. de Cominguez
Compact and Efficient High-Frequency LLC converter with narrow frequency-variation for Aircraft Applications	A. de Juan
Design & multi-objective optimization of a 3-phase SiC traction inverter	A. de Miguel
Circuit analysis and design for self-synchronous rectification of GaN HEMT devices in DC/DC converters	M. García
Dual Active Bridge with Simplified Dual Phase Shift Control over Modified High Topologies comparison for WPT transformer	M.I. Nassef
Design of a Planar Transformer for High Power and High Voltage	M. Moya
Peak and Valley Current Control for buck converters	G. Nuñez
Design of SiC Solid State Transformer for Medium Voltage Applications Using Advanced Optimization Techniques	J.C. Rodríguez
Forward-Flyback Converter with Cockcroft-Walton Voltage Multiplier: Dynamic Modelling and Valley-Switching Control Design	D. Santamargarita
A wireless power transfer system with inverse coupled current doubler rectifier for high output current applications	J.A. Serrano
IGBT rectifier: from low to high power grids	L. Shi
Transformerless, string/multi-string, three-phase-grid-connected inverter for use in commercial/residential 1500-V PV applications"	J. Sierra
	B. Stevanovic

POSTER SESSIONS

EMBEDDED INTELLIGENCE, IOT AND RECONFIGURABLE SYSTEMS

Run-Time Monitoring and ML-Based Modeling in Reconfigurable Multi-Accelerator Systems	J. Encinas
Machine Learning – based Stress recognition using unobtrusive wearable devices	C. Filiu & E. Magán
On-board Machine Learning-based Positioning System for Smart Railway Systems	E. Magán
Highly automated platform for Real-Time validation of Reconfigurable MPSoC-based applications	A. Pérez
Using Chisel to Implement ML Accelerators as Custom RISC-V Instructions	R. Rodríguez & P. Mazariegos
Post-quantum IoT Security in the extreme edge	J. Señor
Automatic data-set generation for deep neural networks training for object classification with LIDAR	C. Wisultschew
Multi-grain Reconfigurable and Scalable Overlays for Hardware Accelerator Composition	R. Zamacola

EMERGING APPLICATIONS

Design of a recording channel for cultured neural networks	A. Aparicio
Use of variable frequency electric fields for brain tumor treating	G. Fernández
Prototype of an electric field generator for brain tumor treatment	P.J. Flores
Detector de alta tensión para catenarias	I. Gálvez-Cañero
Analog Switch Matrix as an interface for connecting the recording and stimulation channels to the microelectrode array of neural networks cultured in vitro	S. García
High Frequency Modular Cascaded Multilevel converter with Carrier Phase-Shifted modulation	L. Gómez
High Frequency Compact GaN Based Switching Inverter to Drive Inkjet Printer Head	L. Gómez
Effects of magnetic resonance technique on implanted devices in the brain using finite element analysis	V. Korenyak
Design of a SiC Inverter for Rotating Magnetic Field in Nanomedical Magnetic Hyperthermia	D. Muñoz
Desarrollo de técnicas y dispositivos para el análisis de señales acústicas biológicas marinas	C. Rodríguez
Design of an electrical stimulation path for biological neural networks	D. Rodríguez
Transformadores planares para amplificadores de potencia de RF	D. Tena
Lossless Data Compressor for Space Applications	D. Vázquez

MODELING, CHARACTERIZATION AND SIMULATION OF COMPONENTS AND POWER CONVERTERS

Free-Software Development for the Automated Generation of PCB Transformers for High-Power & Voltage Applications	A.J. Ávila-Casanova
Methodology for multi-die package semiconductor Thermal Model in a Dynamic Environment	J.M. Barón
Modelling and Control of a Micro-Scaled Redox Flow Battery	A. Bernaldo de Quirós
Characterisation of GaN under Short Circuits events	J. Galindos
Verification of the IGBT's thermal model for a three-phase inverter designed by Fagor	A. García
Nonlinear Stability Analysis of DC-DC Power Electronic Systems by Means of Switching Digital Twin	H. Mazaheri
Set-up's development for the characterization of magnetic materials at high frequency	G. Moral
Comparative Analysis of Different Box Inductor Designs for the Google Little Box Challenge	E. Peredo
A Ripple Estimation Technique for Commercial DC-DC Converters	F. Pérez
Double-pulse testing for characterization of IGBT module	B. Zunzunegui