

# EPE 2021 ECCE Europe

September 6-10, 2021  
Ghent, Belgium

The 23<sup>rd</sup>  
European  
Conference on  
Power Electronics  
and Applications



© VisitGent

<http://www.epe2021.com>

## Call for Papers

- **18 November 2020:** Receipt of synopses
- **3 March 2021:** Notification of provisional acceptance
- **3 June 2021:** Receipt of full typescript for final review



---

## Organization and Venue

---

The Power Electronics community will gather in **Ghent**, Belgium, from 6 to 10 September 2021, to exchange views on research progress and technological developments in the various topics described hereunder. On Monday 6 September a number of tutorials will be organised, and on Friday 10 September several technical visits are planned.

The 23<sup>rd</sup> Conference on Power Electronics and Applications (and Exhibition), EPE'21 ECCE (Energy Conversion Congress and Expo) Europe is co-sponsored by the EPE Association and IEEE PELS. It will take place at the Gent ICC – International Convention Center in Ghent, Belgium.

---

## Aims of the Conference

---

The EPE ECCE Europe conference is the largest in its field, attracting experts from numerous countries every year to join in the discussions. With the objective to exchange and meet fellow professionals and academics, the EPE ECCE Europe conference brings together researchers, engineers, etc. working at the forefront of power electronics technologies. For this type of event, where the future role of power electronics in this ecological and technological revolution will be explored, the EPE ECCE Europe conference is one of the privileged places. EPE ECCE Europe Ghent 2021 will provide the opportunity to discuss a number of subjects, not only during the lecture and poster sessions of the conference but also at the exhibition, industrial forums and tutorials.

---

## Topics

---

Electrification of mobile and non-mobile systems is progressing fast. Novel battery systems are being developed not only for drones, passenger cars and heavy-duty vehicle applications, but also for stationary storage applications. They need intelligent Battery Management Systems and control units as well as appropriate charging devices. For vehicle applications, high-power charging stations are being developed to reduce charging time. Bi-directional V2X charging systems allow for better grid management and, when combined with smart charging, for an increased share of renewables in the electricity mix. Power electronics interfaces, with their emerging wide bandgap (WBG) technologies (such as SiC and GaN), are a key element in these developments towards high energy-efficient systems. The reliability aspect is crucial in these and many other applications. Considering the reliability aspect in the design phase of battery systems, drivetrains, charging systems with both AC and DC networks, etc., will improve the lifespan of those systems and provide more robustness with less maintenance.

On top of the tutorials, lecture and dialogue sessions and technical visits, the organising committees will propose several discussion sessions within the industrial forums as well as special sessions of power electronics related trends. The conference will specifically focus on the following challenging topics:

Tuesday, the 7<sup>th</sup> of September 2021: **Battery Systems**  
(*BMS, Balancing Circuits, Control Units,...*)

Wednesday, the 8<sup>th</sup> of September 2021: **Transportation Electrification**  
(*Charging Systems, V2X, Energy Management,...*)

Thursday, the 9<sup>th</sup> of September 2021: **Reliability of Power Electronic Systems and Components**  
(*Failure Mechanisms, Predictive Algorithms,...*)

The conference topics are as follows:

## **I POWER ELECTRONICS COMPONENTS AND CONVERTERS**

### ***Topic 1: DEVICES, COMPONENTS, PACKAGING AND SYSTEM INTEGRATION***

- 1.a. Passive Components
- 1.b. Active Devices and Components (Si)
- 1.c. Active Devices and Components (Wide Bandgap and other new materials)
- 1.d. Components and Devices for Specific Applications, including for Pulsed Power
- 1.e. System Integration, Packaging & Thermal Management
- 1.f. Reliability & Life-Time

### ***Topic 2: POWER CONVERTERS TOPOLOGIES***

- 2.a. Modular Multilevel Converters
- 2.b. Solid State Transformers
- 2.c. Grid Connected Converters
- 2.d. Resonant Converters
- 2.e. HF Power Converters
- 2.f. Wide-Band Gap Power Electronics

### ***Topic 3: CONVERTER MODELLING, DESIGN AND LOW-LEVEL CONTROL***

- 3.a. Converter Design and Optimisation
- 3.b. Converter Modelling and Low-level Control, including Gate-Drives
- 3.c. EMI/EMC in Power Electronics including HF Phenomena

### ***Topic 4: MEASUREMENT, SUPERVISION AND CONTROL FOR POWER CONVERTERS***

- 4.a. Standard and Advanced Modulation Techniques
- 4.b. Standard and Advanced Current / Voltage / Synchronization Control Techniques
- 4.c. Estimation, Identification and Optimisation Methods
- 4.d. Measurement Techniques, Sensors and State Observers
- 4.e. Condition Monitoring and Life-Time Prediction

## **II POWER ELECTRONICS APPLICATIONS**

### ***Topic 5: ELECTRICAL MACHINES AND DRIVE SYSTEMS***

- 5.a. Electrical Machines and Actuators
- 5.b. Adjustable-Speed Drives and Converter-Machine Interactions
- 5.c. Design, Optimisation and Control of Electric Drives
- 5.d. Condition Monitoring and Life-Time Prediction

### ***Topic 6: RENEWABLE ENERGY POWER SYSTEMS***

- 6.a. Wind-Energy Systems
- 6.b. Solar-Energy Systems
- 6.c. Other Renewable-Energy Systems
- 6.d. Energy Harvesting
- 6.e. Energy Storage Systems for Renewable Energy

**Topic 7: GRIDS, SMART GRIDS, AC & DC**

- 7.a. Power Electronics in Transmission and Distribution Systems
- 7.b. HVDC & FACTS
- 7.c. Micro-Grids
- 7.d. Smart Grids
- 7.e. Mobile Power Stations
- 7.f. Power Quality Issues and Power Factor Correction Techniques
- 7.g. DC Grids including Fault Coordination and Protection
- 7.h. Hybrid Circuit Breakers
- 7.i. Real-Time Simulation and Hardware in the Loop

**Topic 8: E-MOBILITY**

- 8.a. Electric Drive Trains for On- and Off-Road Vehicles
- 8.b. Electric Drive Trains for Rail Vehicles
- 8.c. Electric Drive Trains for Aerospace and Space Applications
- 8.d. Electric Drive Trains for Marine Applications (Offshore, Subsea and Ships)
- 8.e. On-Board Power Converters
- 8.f. Batteries: Management Systems (BMS), Monitoring and Life-Time Prediction
- 8.g. Vehicle Battery Chargers: Contact and Contactless
- 8.h. Fuel Cells: Converters, Control, Diagnostics and System Integration
- 8.i. Smart Charging and Vehicle to Grid Interaction

**Topic 9: POWER SUPPLIES AND INDUSTRY-SPECIFIC APPLICATIONS**

- 9.a. Low Voltage DC Power Supplies
- 9.b. High Voltage DC Power Supplies
- 9.c. Distributed Power Supplies
- 9.d. Uninterruptible Power Supplies (UPS)
- 9.e. Lighting: Solid-State Lighting and Electronic ballasts
- 9.f. Contactless (Wireless) Power Supply
- 9.g. Industry-Specific Applications (Cement, Steel, Paper, Textile, Mining, etc...)
- 9.h. Applications in Physics Research and Related Areas

**Topic 10: DATA ANALYSIS, ARTIFICIAL INTELLIGENCE AND COMMUNICATION**

- 10.a. Data Analysis applied to Power Electronics and Drive Systems
- 10.b. Application of Artificial Intelligence to Power Electronics and Drive Systems
- 10.c. Communication for Power Electronics and Drive Systems
- 10.d. Wireless Control
- 10.e. Diagnostics

---

**Presentation of Papers**

---

Contributions to EPE'21 ECCE Europe must be presented either as a lecture presentation or as a dialogue presentation. A manuscript must be submitted in English in both cases for inclusion in the Conference Proceedings (electronic version only). Papers for lecture sessions will be strictly limited and selected on the basis of wide audience appeal, ease of understanding and potential stimulation of broad ranging discussion.

No lecture session will be organized during the dialogue session timeslots

---

## Content of Synopses

---

The synopses should consist of a 3 to 5 page anonymous summary, including an abstract with no more than 50 words; topic number and indication of the preference for dialogue or lecture presentation (to be clearly mentioned), key diagrams and a references list.

The synopses will be submitted using the host of the conference on the Internet. A link to the site will be available from <http://www.epe2021.com/>, as well as from <http://www.epe-association.org>. Detailed information and guidelines can be downloaded from the conference website to help you prepare the needed material for submitting a synopsis. The site will soon be open for upload.

Authors of papers provisionally selected for presentation will receive a notification and can download the instructions for preparing the dialogue papers and/or the lecture papers from the website. Final selection will be based on the full paper. The paper will only be included in the Conference Proceedings after receipt of one full registration fee per paper in due terms. Student registration fee is only valid for student participants, not for authors. One single author may not present more than two (2) papers. The publication date of the accepted conference papers will be two weeks before the conference.

A selection of outstanding conference papers will be published afterwards in the EPE Journal, which is an ISI registered journal.

The conference proceedings will be submitted to the IEEE Xplore® digital library.

All presented papers will be listed in the Web of Science (formerly Web of Knowledge), INSPEC database for Engineering. Selected papers published in the EPE Journal will be automatically included in the Web of Science – Core Collection and get a WOS-Accession number. The Organising Committee works toward ensuring that all conference papers are listed in the Core Collection as well. It is already the case since the 2014 edition.

---

## Tutorials – Call for Proposals

---

Several tutorials will be held prior to the conference. Authors willing to propose a tutorial at EPE'21 ECCE Europe are invited to send a proposal to Dr. David OLIVA URIBE at the scientific secretariat (EPE Association, c/o VUB-IrW-ETEC, Pleinlaan 2, B-1050 Brussels, Belgium, e-mail: [David.Oliva.Uribe@vub.be](mailto:David.Oliva.Uribe@vub.be)) before **11 January, 2021**. The proposal will consist of a three-page summary including tutorial title, name and affiliation of the lecturer(s), tutorial objectives and audience, topical outline and provisional schedule of the tutorial.

The tutorials will be organized on **Monday 6 September 2021**.

Tutorial proposals related to all conference topics are welcome.

---

## EPE'21 ECCE Europe provides the best experience

---

*EPE'21 ECCE Europe is committed to providing solutions to the delegates so that they have the best experience of participating in the conference, whether in-person or remotely. Many delegates enjoy virtual participation in conferences while others prefer in-person exchange and networking opportunities. EPE'21 ECCE Europe will endeavour to provide the best experience possible, as well as promote the reduction of the CO2 footprint in travelling to the conference.*

---

## Deadlines

---

Intending authors should note the following deadlines:

- Receipt of synopses: **NEW DEADLINE - WEDNESDAY, 9 December 2020**
- Notification of provisional acceptance: **3 March 2021**
- Receipt of full typescript for final review: **3 June 2021**

---

## *Working Language*

---

The working language of the conference is English, which will be used for all printed material, presentations and discussions.

---

## *Programme and Registration*

---

The provisional programme and registration form will be available from the Internet site early summer 2021. Additional information will be available on: <http://www.epe2021.com>

---

## *Venue*

---

The conference will take place at the Gent ICC – International Convention Center. The conference venue is at walking distance from the main railway station and the city center of Ghent. “Gent Sint-Pieters”, the city’s main railway station, is about 1 hour from the Airport in Brussels. The conference venue offers facilities and services of international quality meeting standards. Wi-Fi access will be free for attendees, everywhere in the congress center.

---

## *Exhibition*

---

As with previous editions, an industrial (and scientific) exhibition will be part of the event. Detailed information is available at [www.epe2021.com](http://www.epe2021.com)  
You can also contact us via e-mail to [Carol.Appelmans@vub.be](mailto:Carol.Appelmans@vub.be)

---

## *Conference Organizing Committees*

---

<u>Conference Chairman</u>	Alex Van den Bossche, UGent
<u>Conference Co-Chairs</u>	Pavel Bauer, Technische Universiteit Delft Rik De Doncker, RWTH – ISEA Braham Ferreira, University of Twente Johan Gyselinck, Université Libre de Bruxelles Omar Hegazy, Vrije Universiteit Brussel Elena Lomonova, Technische Universiteit Eindhoven Wilmar Martinez, KU Leuven & Energyville Joeri Van Mierlo, Vrije Universiteit Brussel
<u>Local Committee Members</u>	Frederik De Belie, UGent Hendrik Vansompel, UGent
<u>Programme Chairman</u>	Sjoerd Bosga, ABB Corporate Research, Sweden
<u>Organising Committee</u>	
Ahola Jero	Lappeenranta University of Technology
Allard Bruno	Université de Lyon
Bacha Seddik	Université de Grenoble - G2ELAB
Bakran Mark	Universität Bayreuth
Bauer Pavol	Delft University of Technology



Benchai Abdelkrim	SuperGrid Institute
Biela Jürgen	ETH Zürich
Blaabjerg Frede	Aalborg University
Bordry Frédéric	C.E.R.N.
Boroyevich Dushan	Virginia Tech
Bosga Sjoerd	ABB Corporate Research / KTH Royal Institute of Technology
Bouscayrol Alain	L2EP, Université de Lille 1
Cacciato Mario	University of Catania
De Doncker Rik	RWTH Aachen ISEA
Doppelbauer Martin	Karlsruhe Institut für Technologie (KIT)
Ferreira Braham	University of Twente
Katic Vladimir	University of Novi Sad
Kennel Ralph	Technische Universität München
Kjaer Philip Carne	Vestas Wind Systems A/S
Krievs Oskars	Riga Technical University
Lamnabhi-Lagarrigue Françoise	LSS Supelec
Lataire Philippe	Vrije Universiteit Brussel
Lomonova Elena	Eindhoven University of Technology
Lorenz Leo	ECPE E.V.
Malinowski Mariusz	Warsaw University of Technology
Marchesoni Mario	Università di Genova
Mawby Philip	University of Warwick
Mermet-Guyennet Michel	Alstom
Mertens Axel	Leibniz Universität Hannover
Munk-Nielsen Stig	Aalborg University
Nee Hans-Peter	Royal Institute of Technology
Perriard Yves	Ecole Polytechnique Fédérale de Lausanne (EPFL)
Rabkowski Jacek	Warsaw University of Technology
Ribickis Leonids	Riga Technical University
Robyns Benoît	Ecole des Hautes Etudes d'Ingénieur
Rufer Alfred	Ecole Polytechnique Fédérale de Lausanne (EPFL)
Schumacher Walter	TU Braunschweig
Semail-Lemaire Betty	University Lille 1
Sudria Antoni	UPC - CITCEA
Thomas Jean-Luc	CNAM
Van Den Bossche Alex	Universiteit Gent
Van Mierlo Joeri	Vrije Universiteit Brussel
Wheeler Patrick	University of Nottingham
Zanchetta Pericle	University of Nottingham
Zawirski Krzysztof	Technical University of Poznan

### International Scientific Committee

Ahola Jero	Lappeenranta University of Technology
Akagi Hirofumi	Tokyo Institute of Technology
Allard Bruno	Université de Lyon
Azzopardi Stéphane	Safran
Bacha Seddik	University of Grenoble - G2ELAB
Bakran Mark	Universität Bayreuth
Bassett Roger	EPE Association
Bauer Pavol	Delft University of Technology
Benchai Abdelkrim	SuperGrid Institute

Blaabjerg Frede	Aalborg University
Böcker Joachim	University of Paderborn
Bordry Frédéric	C.E.R.N.
Boroyevich Dushan	Virginia Tech
Bosga Sjoerd	ABB Corporate Research / KTH Royal Institute of Technology
Bouscayrol Alain	L2EP, Université de Lille 1
Braun Michael	Karlsruher Institut für Technologie
Briff Pablo	GE Renewable Energy
Brock Stefan	Poznan University of Technology
Cacciato Mario	University of Catania
Carpita Mauro	University of Applied Sciences of Western Switzerland
Colombi Silvio	ABB Switzerland
Davari Pooya	Aalborg University
De Belie Frederik	UGent
De Doncker Rik	RWTH Aachen ISEA
Dede Enrique	
Dieckerhoff Sibylle	Technische Universität Berlin
Dijkhuizen Frans	ABB Corporate Research
Doppelbauer Martin	Karlsruher Institut für Technologie (KIT)
Dujic Drazen	Ecole Polytechnique Fédérale de Lausanne - EPFL
Eckel Hans-Günter	University of Rostock
Ferreira Braham	University of Twente
Friebe Jens	Leibniz Universität Hannover
Gaubert Jean-Paul	Université de Poitiers - LIAS - ENSIP
Gennaro Francesco	STMicroelectronics
Gyselinck Johan	Université Libre de Bruxelles
Hahn Ingo	Friedrich-Alexander Universität Erlangen-Nürnberg
Hegazy Omar	Vrije Universiteit Brussel
Hendrix Marcel	Eindhoven University of Technology
Hiller Marc	Karlsruhe Institute of Technology (KIT)
Hofer Matthias	Technische Universität Wien
Hoffmann Klaus F.	Helmut-Schmidt-University Hamburg
Hofmann Wilfried	Technische Universität Dresden
Jennings Michael	Swansea University
Jung Marco	Hochschule Bonn-Rhein-Sieg
Karlsson Per	CG Drives & Automation
Katic Vladimir	University of Novi Sad
Kazmierkowski Marian P.	Warsaw University of Technology
Kennel Ralph	Technische Universität München
Kjaer Philip Carne	Vestas Wind Systems A/S
Krievs Oskars	Riga Technical University
Kyyra Jorma	Aalto University
Lamnabhi-Lagarigue Françoise	LSS Supelec
Lataire Philippe	Vrije Universiteit Brussel
Li Yongdong	Tsinghua University
Lindemann Andreas	Otto-von-Guericke-University Magdeburg
Liserre Marco	Christian-Albrechts-Universität Kiel
Lomonova Elena	Eindhoven University of Technology
Lorenz Leo	ECPE E.V



Lutz Josef	TU Chemnitz
Malinowski Mariusz	Warsaw University of Technology
Mallwitz Regine	Technische Universität Braunschweig
Marchesoni Mario	Università di Genova
Martinez Wilmar	KU Leuven & Energyville
Mawby Philip	University of Warwick
Mermet-Guyennet Michel	Alstom
Mertens Axel	Leibniz Universität Hannover
Meuret Regis	Hispano-Suiza
Monmasson Eric	Université de Cergy-Pontoise
Montesinos Daniel	CITCEA-UPC
Morancho Frederic	LAAS - CNRS
Munk-Nielsen Stig	Aalborg University
Musumeci Salvatore	Politecnico di Torino
Nami Alireza	ABB AB Corporate Research
Nee Hans-Peter	Royal Institute of Technology
Orlik Bernd	Universität Bremen
Peftitsis Dimosthenis	Norwegian University of Science and Technology
Perriard Yves	Ecole Polytechnique Fédérale de Lausanne (EPFL)
Pietrzak-David Maria	Université Toulouse Midi Pyrénées -Laboratoire PLA
Pouresmaeil Edris	Aalto University
Rabkowski Jacek	Warsaw University of Technology
Ranstad Per	KTH Royal Institute of Technology
Ribickis Leonids	Riga Technical University
Richardeau Frédéric	LAPLACE - University of Toulouse
Robyns Benoît	Ecole des Hautes Etudes d'Ingénieur
Rodic Miran	University of Maribor
Rufer Alfred	Ecole Polytechnique Fédérale de Lausanne (EPFL)
Schanen Jean-Luc	G2ELAB
Scheuermann Uwe	Semikron Elektronik GmbH
Schierling Hubert	Siemens AG
Schröder Günter	University of Siegen
Schumacher Walter	TU Braunschweig
Semail-Lemaire Betty	University Lille 1
Siala Sami	GE Energy Power Conversion
Siemaszko Daniel	Power Electronics and Systems Consultancy
Siemieniec Ralf	Infineon Technologies Austria AG
Sneyers Brigitte	EPE Association
Sudria Antoni	UPC - CITCEA
Sumner Mark	University of Nottingham
Tenconi Sandro	CNAM
Thomas Jean-Luc	Compleo Charging Solutions GmbH. Dortmund
Turki Faical	Warsaw University of Technology
Ufnalski Bartlomiej	Universiteit Gent
Van Den Bossche Alex	Vrije Universiteit Brussel
Van Mierlo Joeri	ABB Corporate Research
Vemulapati Umamaheswara Reddy	Berne University of Applied Sciences
Vezzini Andrea	SMA Solar Technology AG
Victor Matthias	

Viitanen Tero	ABB Power Conversion
Wheeler Patrick	University of Nottingham
Wijnands Korneel	Eindhoven University of Technology
Wu Zhihong	Tongji University
Yuan Xibo	University of Bristol
Zanchetta Pericle	University of Nottingham
Zawirski Krzysztof	Technical University of Poznan
Zobaa Ahmed	Brunel University London

### EPE/IEEE-PELS Coordination Committee

The overall management of the Congress is conducted by the Coordination Committee to ensure consistency in strategy, scope and content of the Conferences from year to year. The committee issues a Call for future locations of the Conferences, and forwards its recommendations to the EPE Executive Council as well as to the IEEE-PELS Administrative Committee for final approval.

#### **Members**

##### ***EPE representative members:***

Martin Doppelbauer, Philip C Kjaer, Elena Lomonova, Leo Lorenz, Yves Perriard, Jean-Luc Thomas

##### ***IEEE-PELS representative members:***

Liuchen Chang, Rik De Doncker, Braham Ferreira, Ralph Kennel, Mario Pacas, Pat Wheeler

#### **Secretariat**

EPE Secretariat  
Philippe Hamacher  
EPE Association  
C/o Vrije Universiteit Brussel - IrW - ETEC  
Pleinlaan 2, Boulevard de la Plaine  
B-1050 Brussels  
Tel: +32 (0)470 65 79 90  
Fax: +32 (0)2 629 36 20  
E-mail : [Philippe.Hamacher@vub.be](mailto:Philippe.Hamacher@vub.be)

#### **Local Secretariat**

Ghent University  
Faculty of Engineering and Architecture  
Department of Electromechanical, Systems and Metal Engineering  
E-mail: [epe2021@ugent.be](mailto:epe2021@ugent.be)