

Organisational Information

Sign up at: www.ecpe.org/events

Registration Deadline:

25 November 2021

Participation Fee:

- € 395,- * for industry
 - € 290,- * for universities/institutes
 - € 120,- * for students/PhD student (limited spaces; copy of students ID required)
- * plus VAT

- The participation fee includes lectures and digital proceedings (provided 1 day prior to the event by email).
- Participation by web conference tool (Webex). Access data will be provided by email.
- Upon receipt of registration confirmation via email you are signed-up for the event. The invoice will be sent via email.
- Three participants from each ECPE member company free of charge. Allocation in sequence of registration.
- 10% discount on university/institute fee for participants from ECPE competence centres.
- Cancellation policy: Full amount will be refunded in case of cancellation up to 1 week prior to the event. After this date 50 % of the fee is non-refundable (substitutes are accepted anytime).

Organisational Information

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Technical Chairmen



Prof. Johann W. Kolar
ETH Zurich (CH)



Dr. Matthias Kasper
Infineon Technologies Austria (AT)



Prof. Thierry Meynard
University Toulouse
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European Center for
Power Electronics e.V.

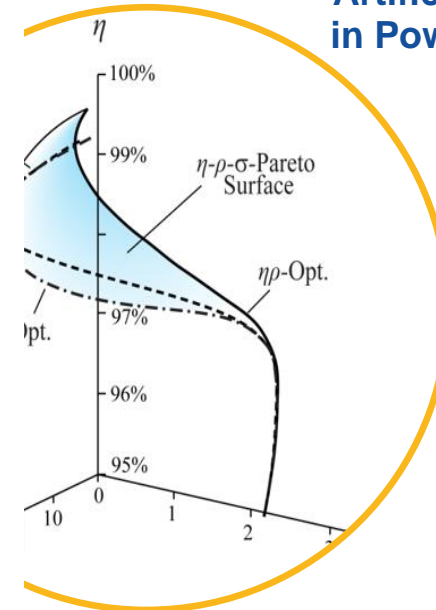
Digital Event

ECPE Workshop Programme

Steps towards Design Automation & Artificial Intelligence in Power Electronics

2 - 3 December 2021

in cooperation with



ECPE Online Workshop

Steps towards Design Automation and Artificial Intelligence in Power Electronics

2 - 3 December 2021
Digital Event

Design Automation is of increasing importance for the Power Electronics community to obtain higher efficiencies and more compact designs at lowest costs. Main challenges of power electronics designs especially in highly integrated systems are related to multi-physics interactions, shorter design time and multi-parameter and multi-objective optimization. Design automation techniques can help to optimize power electronics systems in efficiency, size, thermal performance, EMI performance and costs, and to identify and understand the design limits imposed by the currently available technologies.

The goal of this ECPE Workshop is to discuss and identify the potentials of Design Automation in Power Electronics, identify methodologies and tools that have been developed and used to resolve the issues during design and optimisation of modern power electronics components and systems. The professionals from industry and research institutions with experience in both Power Electronics and Design Automation will be brought together to present and discuss their opinion, experience, needs and vision of future.

The expected results of the workshop are:

- Identifying the potential, challenges and risks of Design Automation in the field of Electronics
- An understanding of the limits of the current methodologies and tools
- Future role and limits of measurement technology for verifying Design Automation results

The workshop is chaired by:

Prof. Johann W. Kolar, ETH Zurich (CH)
Dr. Matthias Kasper, Infineon Technologies Austria (AT)
Prof. Thierry Meynard, University Toulouse, ENSEEIHT – LAPLACE (FR)

All presentations and discussions will be in English.

Programme

Thursday, 2 December 2021

08:30 WebEx started

Introduction (overview, status, trends)

09:00 **Welcome, Opening and Introduction**
Thomas Harder, ECPE; Johann W. Kolar, ETH Zurich

09:30 **DAPE Status & Trends and IEEE Activities**
Alan Mantooh, Univ. of Arkansas (US)

10:00 **Break**

10:10 **The Future Role of Artificial Intelligence in Power Electronics** | Andreas Roskopf, Fraunhofer IISB(DE)

10:40 **General Perspective for Power Electronics**
Johann W. Kolar, ETH Zurich (CH)

11:10 **Break**

EDA on Component and Module Level (incl. passives)
Session Chair: Matthias Kasper

11:20 **Magnetics Thermal Model using Artificial Neural Networks** | Miroslav Vasic, Univ. UPM Madrid (ES)

11:50 **Device-to-Circuit Modeling: The Example of SiC Power MOSFETs**
Ivana Kovacevic, Ulrike Grossner, ETH Zurich (CH)

12:20 **Lunch Break**

13:20 **Advanced Magnetic Design and Integration**
Minjie Chen, Univ. of Princeton (US)

13:50 **Thermal Topology Optimisation for High Power Density Power Electronics**
Ingmar Kallfass, Univ. of Stuttgart (DE)

14:20 **Break**

EDA on Converter and System Level
Session Chair: Thierry Meynard

14:30 **From Product Thinking to System Understanding with Pareto Fronts**
Matthias Kasper, Infineon Technologies Austria (AT)

15:00 **Implementation of an Automated Power Electronics Design Tool in Hitachi Energy**
Ralph Burkart, Hitachi Energy Research (CH)

15:30 **Break**

15:40 **Machine Learning Estimators for Power Electronics Design and Optimization**
Dragan Maksimovic, Univ. of Colorado Boulder (US)

16:10 **Open-Source Optimization Toolbox, a Necessary Step toward EDA by Machine Learning**
Timothé Delaforge, Bern Univ. of Appl. Sciences (CH)

16:40 **Discussion**

17:00 **End of 1st Day**

Programme

Friday, 3 December 2021

08:30 WebEx started

Best Practice in Applications
Session Chair: Thomas Harder

09:00 **Advanced Drive based Crane Features and Virtual Reality for Modelling & Learning**
Maitsetseg Ravdandorj, ABB (CH)

09:30 **Automated Design of Electrical Drivetrains based on Multi-Domain Modelling and Optimization**
Jan Allgeier, Robert Bosch (DE)

10:00 **Break**

10:10 **Drive Train Performance Analysis & Digital Testbench**
Tobias Wellerdieck, BRUSA (CH)

(AI-based) Methods and Tools
Session Chair: Chis Gould

10:40 **From Converter Optimization to System Level Design**
François Boige, Gamma Technologies (FR)

11:10 **Break**

11:20 **Key Strategies in Magnetics Designs: Time and Accuracy**
Miguel Carmona, Frenetic (ES)

11:50 **Automated Design with Blocks using Plecs as Design Tool**
Thierry Meynard, Univ. of Toulouse (FR)

12:20 **Lunch Break**

13:10 **ANN Powered Models for Magnetic Components**
Thomas Guillod, ETH Zurich (CH) / Dartmouth College (US)

13:40 **Automated Parameter Design for Converter and Magnetics based on the Practice of the Tiny Power Box Project**
Alexander Connaughton, Silicon Austria Labs (AT)

14:10 **Discussion: Vision and Needs, Today's Limitations and Obstacles, Research Directions**
Chairs: J.W. Kolar, M. Kasper, Th. Meynard

15:15 **Closing Words**

10 minutes afternoon break in between

15:30 **End of Workshop**