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EPE 2018 ECCE Europe, RIGA, LATVIA: 17 to 21 September 2018

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Make sure to meet our outstanding keynote authors:

Keynote 1, Tuesday 18 September 2018, 9h30:

Design for reliability in Power Electronic Systems, Prof. Frede Blaabjerg, Aalborg University, Denmark



In recent years, the automotive and aerospace industries have brought stringent reliability constraints on power electronic converters because of safety requirements. Today customers of many power electronic products expect up to 20 years (or even longer) of lifetime and they also want to have a "failure free period" and all with focus on the financials. The renewable energy sectors are also following the same trend, and more and more efforts are being devoted to improving power electronic converters to account for reliability with cost-effective and sustainable solutions. This presentation will introduce the recent progress in the reliability aspect study of power electronic converters for power electronic applications with special focus on renewables. It will cover the following contents: the motivations for highly reliable electric energy conversion in renewables; the reliability requirements of typical power electronic systems; failure mechanisms and lifetime models of key power electronic components (e.g., power semiconductor switches, capacitors, and fans); long-term mission profiles in renewable

applications and their components; reliability analysis methods for more complicated systems, tools to be applied, and improvement strategies of power electronic converters in their applications. A few case studies will be given.

Frede Blaabjerg (S'86–M'88–SM'97–F'03) was with ABB-Scandia, Randers, Denmark, from 1987 to 1988. From 1988 to 1992, he got the PhD degree in Electrical Engineering at Aalborg University in 1995. He became an Assistant Professor in 1992, an Associate Professor in 1996, and a Full Professor of power electronics and drives in 1998. From 2017 he became a Villum Investigator.

His current research interests include power electronics and its applications such as in wind turbines, PV systems, reliability, harmonics and adjustable speed drives. He has published more than 500 journal papers in the fields of power electronics and its applications. He is the co-author of four monographs and editor of ten books in power electronics and its applications. He has received 27 IEEE Prize Paper Awards, the IEEE PELS Distinguished Service Award in 2009, the EPE-PEMC Council Award in 2010, the IEEE William E. Newell Power Electronics Award 2014 and the Villum Kann Rasmussen Research Award 2014. He was the Editor-in-Chief of the IEEE TRANSACTIONS ON POWER ELECTRONICS from 2006 to 2012. He has been Distinguished Lecturer for the IEEE Power Electronics Society from 2005 to 2007 and for the IEEE Industry Applications Society from 2010 to 2011 as well as 2017 to 2018. In 2018 he is President Elect of IEEE Power Electronics Society. He is nominated in 2014, 2015, 2016 and 2017 by Thomson Reuters to be between the 250 most cited researchers in Engineering in the world. In 2017 he became Honoris Causa at University Politehnica Timisoara (UPT), Romania and in 2018 he became Honoris Causa at Tallinn Technical University (TTU)

Keynote 2, Wednesday 19 September 2018, 9h00

Emergency of the DC microgrids in electro-intensive applications: Daniel RADU, Director of Technology Power Systems Center, Building & IT Business, Schneider Electric, France

Nowadays the increasing of the cost of the energy (electricity, oil, fuel, ...) and his availability (e.g. limited available power in national grids) conduct the electro-intensive applications owners to look to a drastically improvement of energy efficiency. One investigated option is the use of DC electrical distribution architectures in order to avoid unnecessary power losses. This was allowable due to the development of the power electronics bringing higher efficiency, higher reliability, lower cost and easily maintenance. The keynote will discuss the investigations done for the DC microgrids in a marine application (onboard vessels) as well for the large data centers.



Daniel Radu (M'06) obtained a Ph.D. degree in Electrical Engineering, in 2004, from the University "POLITEHNICA" of Bucharest, Romania. From 1998 to 2002 he has been assistant professor of Electrical Engineering in the same University. Follow this was involved in research and teaching activity with Power Engineering Laboratory of Grenoble – LEG, France. He is currently with Schneider Electric, France, since 2006. His interests include large data center applications, semiconductor manufacture electrical facilities, shore connection systems, low and medium voltage power systems transient analysis, power systems modelling, LV and MV equipments and system design. He published more than 30 international papers in conferences proceedings and journals and several white papers in the field of Electro-Intensive Applications. He holds several patents in the field of power quality, frequency conversion applications and power systems. Also, he participates as technical expert to the TC18 & TC23 committees of IEC, is IEEE member since 2006 and SEMI Standard member since 2017. From 2012 to 2016 he was convener of the IEC/ISO/IEEE JWG28 Cold Ironing, a group of 30 international experts mandated to develop the Shore Connection Standards.

Keynote 3, Wednesday 19 September 2018, 9h30

Fast Charging in the Urban Environment - Infrastructure Challenges and Opportunities, Prof. Dr. ir. Dr. h.c. T.U.Riga, Rik W. De Doncker, RWTH Aachen, Germany

Charging of electric vehicles, in particular fast charging, in cities is a major challenge for the existing AC infrastructure. Even charging multiple vehicles overnight quickly overloads the low-voltage distribution grid. In addition, as the automotive industry launches the proposition that fast charging up to 350 kW is a customer requirement, offering fast-charging stations could become a business opportunity. In this presentation, solid state solutions are presented that build on existing AC infrastructure to accommodate high-power charging.



Rik W. De Doncker (M'87-SM'99-F'01) received his Ph.D. degree in electrical engineering from the KULeuven, Belgium. In 1987, he was appointed Visiting Associate Professor at the University of Wisconsin, Madison, where he developed the DAB converter. In 1988, he joined the GE Corporate Research and Development Center, Schenectady, NY. In November 1994, he joined Silicon Power Corporation (formerly GE-SPCO) as Vice President Technology, developing world's first medium-voltage static transfer switch. Since Oct. 1996, he is professor at RWTH Aachen University, Germany, where he leads the Institute for Power Electronics and Electrical Drives (ISEA). In Oct. 2006 he was appointed director of the E.ON Energy Research Center at RWTH Aachen University, where he also founded the

Institute for Power Generation and Storage Systems. He is director of the RWTH CAMPUS Cluster Sustainable Energy and leads the BMBF Flexible Electrical Networks (FEN) Research CAMPUS. He has a doctor honoris causa degree of TU Riga, Latvia. He has published over 400 technical papers and is holder of more than 40 patents. Dr. De Doncker is recipient of the IAS Outstanding Achievements Award and the IEEE Power Engineering Nari Hingorani Custom Power Award (2008). In 2009, he led a VDE/ETG Task Force on Electric Vehicles. In 2010, he became member of the German National Platform for electro-mobility. He is the recipient of the 2013 Newell Power Electronics IEEE Technical Field Award, and the 2014 IEEE PELS Harry A. Owen Outstanding Service Award. In 2015 he was awarded Fellow status at RWTH University. In 2016 he became member of the German Academy of Science and Technology (ACATECH). 2017 he became Member of the International Advisory Board of the French automotive research institute VEDECOM.

Keynote 4, Thursday 20 September 2018, 9h00

Power Electronics for future power grids: drivers and challenges: Dr. Alireza Nami, ABB Corporate Research Sweden

Currently, electric power systems start to shift toward more environment friendly energy productions to limit the climate change and reduce pollutions. The major focus is the variability of the new energy sources, and reliability of the supply. The challenge for the future electric power grids is how to integrate a widespread addition of renewable sources with intermittent nature in both transmission and distribution grids without compromising reliability, stability and cost of the service to the consumers. A system that can handle a generation mix with a high percentage of renewables will become a necessity which requires solutions as increased transmission capacity through AC and DC solutions, and/or a larger energy storage capacity in the grids.

Grid-connected converter technologies have had a truly revolutionary impact on the way that electrical energy is delivered to consumers all over the world, and has become an indispensable part of the electric power systems today. It is anticipated that by 2030 all electric power generated utilizes power electronics somewhere between the point of generation and its end. Power electronics contribute in many ways to more efficient use of energy, which allows for energy savings, which in turn leads to reduced environmental impact. The R&D in this field aims at optimizing complex decisions and solutions that are required for the design of these power electronic converters to deliver innovation for the future conversion, processing, transmission, distribution as well as storage of energy across a wide range of applications.

This presentation will start with an overview of the main drivers for the future grids. Then the historical, the present and the future power grid will be discussed including the developments of power electronics in grid-connected applications such as HVDC and FACTS together with more futuristic applications. Moreover, the key design parameters of power electronics and its functionalities will be described in the context of megatrends and grand challenges of the electric power system evolution. Finally, the current state of the art and topics for the future research will be presented.



Alireza Nami (S'07–M'10–SM'16) received his Ph.D. in Power Electronics from Queensland University of Technology, Australia, in 2010. From 2010 to 2011, he was a Postdoctoral Research Fellow in Global Center of Excellence, Kumamoto University, Japan. Since 2011, he has been with ABB Corporate Research Sweden initially as a Scientist and later as a Senior Scientist, a Principal Scientist, and an R&D Project leader, in the research field of power converter design and control for various applications especially high voltage and high power applications such as HVDC and FACTS, system integration technology for renewable energy sources, etc. Currently, he is R&D manager and leading a power electronics team at ABB Corporate Research Centre, Vasteras, Sweden including extensive laboratory facilities for multi-megawatt testing capabilities enabling cutting edge research in the areas of grid connected power electronics.

Dr. Nami has served several leading power electronics conferences as an invited speaker and a technical chair. He is author/co-author of number of conference and journal publications. He is inventor/co-inventor of several patent applications which have been adopted by the industry. He is an Associate Editor of the IEEE Transaction on Power Electronics, a member of Cigre working group, and a member of the International Scientific Committee of the European Power Electronics and Drives Association.

Keynote 5, Thursday 20 September, 9h30

Power Grids Control: drivers and trends, Bruno Luscan, Supergrid Institute, France

The energy transition objectives can't be achieved without a massive integration of renewable energy sources into power grids. On one hand, this integration requires to reinforce large scale transmission system capacity, and interconnections between countries, in order to create an electricity market and the conditions for renewable energy trading. On another hand, conventional generation connected to the grid through synchronous generators is replaced by renewable generation which is connected to the grid through power-electronics converters.

This trend leads to three major changes for the grid:

- HVDC transmission is becoming an important part of the grid
- AC system inertia is reducing and system dynamics are modified
- Grid-connected power electronics converters can be controlled in order to support grid operation

The presentation will cover the following aspects of power grid controls:

- The well-established principles of AC power system control
- The principles of HVDC control, in a PtP link or in a multi-terminal system
- The impact of AC system inertia reduction on power system stability
- The contribution of Grid-connected power electronics converter to power system stability
- The contribution of HVDC transmission to AC stability control

Starting from the physics of the system, a selection of key control challenges will be explained, and some major evolutions in power grid control will be put into perspective.



Bruno Luscan graduated from Ecole Polytechnique in 1989 and Ecole Nationale de Techniques Avancées in 1991, in France. Since he joined Alstom group in 1991, he has led research and development projects, activities and organizations for 26 years. He started as a research engineer for high voltage switchgear and circuit-breakers, developing, at the time, the first 420kV one-break circuit-breaker. He then became technical department manager and led the development of a new range of HV air-insulated circuit-breakers rated 245-800kV, including product industrialization, during six years. During four years he was the technical director for dead-tank circuit-breakers product development, based in the USA. During two years he was the R&D director for Distribution and Medium power transformers product line, setting-up a global R&D organization for this activity (seven factories worldwide). He then became technology program director for Alstom Grid, and he initiated and led the SuperGrid Institute project at the end of 2010. From 2014 onwards, he has been working for the SuperGrid Institute, and leads the R&D program

related to power system analysis, including multi-terminal HVDC architecture, protection and control, modelling and simulation; he is also the chair of the SuperGrid Institute scientific council.

Technical Programme: https://wd.cborg.info/EPE2018/program_preliminary.html

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9:10		9:10	Session LS1a Topic 1 Room 1	Session LS1b Topic 2 Room 2	Session LS1c Topic 3 Room 3	Session LS1d Topic 4 Room 4	Session LS1e Industrial Forum Room 5	9:10	Session LS3a Topic 1 Room 1	Session LS3b Topic 3 Room 2	Session LS3c Topic 7 Room 3	Session LS3d Topic 8 Room 4	Session LS3e Industrial Forum Room 5	9:10	Session LS5a Topic 3 Room 1	Session LS5b Topic 5 Room 2	Session LS5c Topic 2 Room 3	Session LS5d Topic 6 Room 4	
9:20		9:20	Coffee break - Exhibition Hall and foyers					9:20	Coffee break - Exhibition Hall and foyers					9:20	Coffee break - Exhibition Hall and foyers				
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I POWER ELECTRONICS COMPONENTS AND CONVERTERS

- Topic 1: Devices, components, packaging and system integration
- Topic 2: Power converters topologies and design
- Topic 3: Measurement and control

II POWER ELECTRONICS APPLICATIONS

- Topic 4: Electrical machines and drive systems
- Topic 5: Renewable energy power systems
- Topic 6: Grids, smart grids, AC & DC
- Topic 7: Power supplies
- Topic 8: Electric vehicle propulsion systems and their energy storage
- Topic 9: Industry specific energy conversion and conditioning technologies

The Tutorials :

T1 - Designing with SiC & GaN Devices With Emphasis on EMC & Safety Considerations; Dr. Supratim Basu, Prof. Tore Undeland & Prof. Jorma Kyyrä

T2 - Fast Charging Ready? Infrastructure, Topologies and Key Enabling Components; Prof. R. W. De Doncker, Prof. D. U. Sauer, RWTH-ISEA and E.ON ERC

T3 - Control for Grid-Friendly Power Converter Systems; Frede Blaabjerg, Yonheng Yang, Aalborg University, Denmark; Yi Tang, Nanyang Technological University, Singapore

T4 - Stability Analysis and Damping of Grid-Converter Interactions; Lennart Harnefors, ABB Corporate Research, Västerås, Sweden; Xiongfei Wang, Aalborg University, Denmark; Mats Larsson, ABB Corporate Research, Baden, Switzerland

T5 - Reliability of PV systems - from basic theory to practical experiences; Frede Blaabjerg, Denmark; Boris Dumnic, Dragan Milicevic, Vladimir Katic, Bane Popadic, University of Novi Sad, Faculty of Technical Sciences, Novi Sad, Serbia

T6 - Modular Multilevel Converters – MMC: Principles, Design, Control, Modelling and HVDC Applications; Kamran Sharifabadi-Technology Adviser: Power Grid & Regulatory Affairs – Statoil, Norway, Staffan Norrga, Hans Peter Nee, KTH, Lennart Harnefors – Professor, ABB Corporate Research, Västerås and KTH, Sweden, Remus Teodorescu - Professor, Department of Energy Technology, Aalborg University, Denmark

T7 - Capacitors in Power Electronics Applications – Passive and Active Capacitive DC Links; Huai Wang, Haoran Wang, Center of Reliable Power Electronics (CORPE), Aalborg University, Denmark

T8 - Thermal and Reliability Modelling of Power Electronics Systems; Amir Sajjad, Francesco Iannuzzo, Aalborg University, Denmark

T9 - Permanent Magnet Machine Design and Applications; Prof. Bulent Sarlioglu, PhD, University of Wisconsin-Madison

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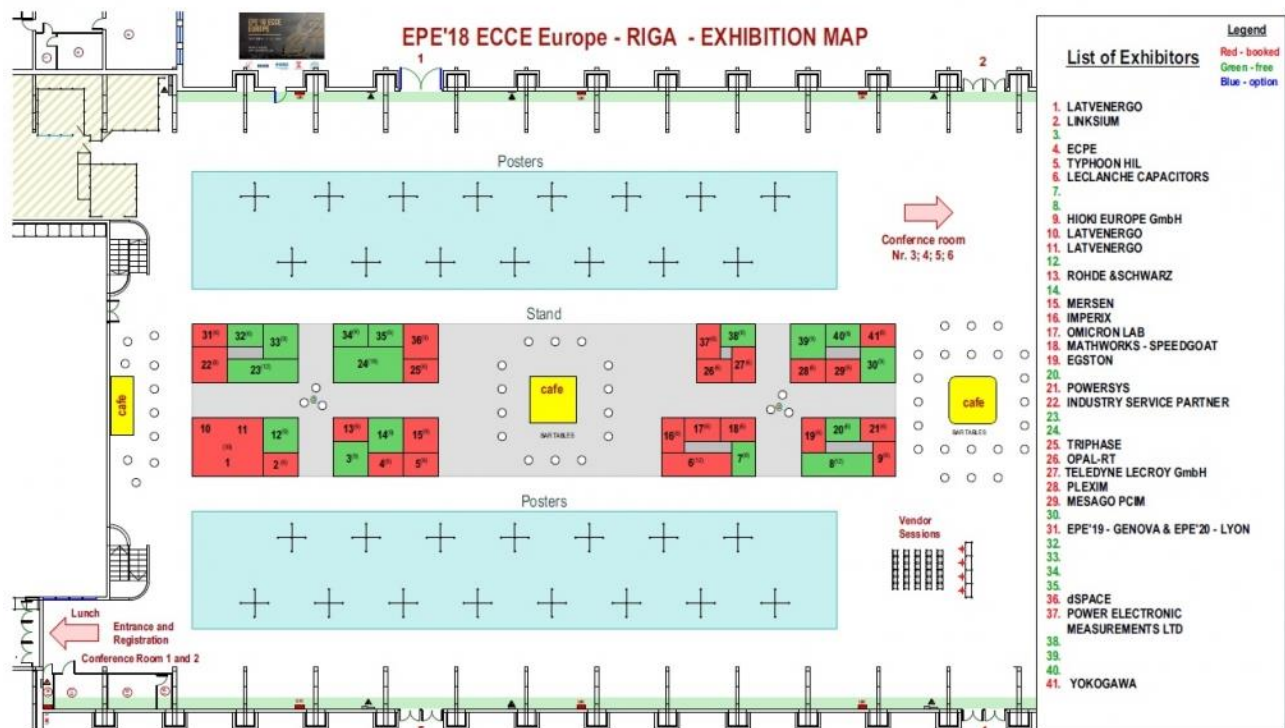
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Invitation for
IEEE PELS Young Professionals Meet-Up @ EPE'18 – ECCE Europe

Tuesday, September 18, 8 PM – 10:00 PM

*Faculty of Architecture, Riga Technical University Campus (6 Kipsalas St.), Riga, Latvia
(4-minute walk from the conference venue)*

You Are Invited!

An opportunity to mingle, interact, learn from the best minds of IEEE Power Electronics Society (PELS) and have some fun!

IEEE Power Electronics Society (PELS) cordially invite you to join this event to learn from the life journey of the biggest leaders in power electronics at EPE'18 – ECCE Europe along with an evening well spent talking to people from far and wide.

This year, the IEEE PELS Students and Young Professionals Committee will host this event – IEEE PELS Young Professionals Meet-Up @ EPE'18 – ECCE Europe. It will specially be filled with invited speeches, meeting new power electronics peers, learning about the best practices in industry and academia, and having loads of fun with complimentary drinks and snacks. This event is free and open to all students, young professionals, and engineers. So, make sure you do not miss this wonderful chance to make new friends and meet new people.

Please register at <https://goo.gl/forms/FGN25wI3UjHGUH0S2> before September 10 to mark your presence for this amazing evening at EPE'18 – ECCE Europe in Riga.

IEEE PELS Students and Young Professionals Committee

Post Doctor position in Medium Voltage DC grid design and optimization for underwater applications (IE-149-2018)

Application deadline: October 1, 2018.

The Faculty of Information Technology and Electrical Engineering, <http://www.ntnu.edu/ie> at the Norwegian University of Science and Technology (NTNU) has a vacancy for a 100% position (2 years) as a Post Doc researcher at the Department of Electric Power Engineering <http://www.ntnu.edu/elkraft>. The described Post Doc position is part of a research project on "High-Efficiency all-electric DC supply systems for subsea work-class remotely operated vehicles (HEROVs)". HEROVs is a joint research collaboration between NTNU and two industrial partners: Ingeteam Power Technology S.A. based in Bilbao, Spain, and Argus Remote Systems A.S. based in Bergen, Norway.

More info about the positions can be found here: <https://www.jobbnorge.no/en/available-jobs/job/155468/post-doctor-position-in-medium-voltage-dc-grid-design-and-optimization-for-underwater-applications-ie-149-2018>

TC1-Sponsored Workshop about "Interlock times" at EPE 2017 ECCE: Report to be published

TC1-Sponsored Workshop at EPE 2017 "Interlock times—necessary, useful or not needed at all?"



- Report to be published in IEEE PELS Magazine in September 2018 issue

ECPE: Calendar of Events 2018

Date	Location	Event	Topic
10-11 September	Copenhagen, Denmark	ECPE Tutorial	'Passives in Power Electronics: Magnetic Component Design and Simulation' Chairmen: Prof. G. Hurley (Nat. Univ. of Ireland), Dr. Z. Ouyan (Techn. Univ. of Denmark)
4-5 October	Catania, Italy	ECPE Tutorial	Power Semiconductor Devices & Technologies Chairmen: Dr. A. Mauder (Infineon), Prof. D. Silber (Univ. of Bremen)
10-11 October	Toulouse, France	ECPE Tutorial	Function and Design of Multilevel and Multicell Converter Chairmen: Prof. M. Hiller (KIT), Prof. T. Meynard (Univ. Toulouse)
17-18 October	Lyon, France	ECPE Tutorial	Power Circuits for Clean Switching and Low Losses Chairman: Dr. R. Bayerer (Infineon)
20 - 21 November	Nuremberg, Germany	ECPE Workshop	The Future of Modelling and Simulation in Power Electronics Packaging for Thermal and Stress Management Chairmen: Prof. U. Scheuermann (Semikron), Prof. B. Wunderle (TU Chemnitz)

For the information about ECPE Workshops and Tutorials, please visit the ECPE website www.ecpe.org

Future EPE ECCE Europe and Technically Sponsored Conferences

2018:

- Field-Based Insights into the Implementation of Renewable Energies – 12-17 August 2018, Mont-Soleil, Saint-Imier, Switzerland:
<http://www.societe-mont-soleil.ch>
- IEEE-PEMC - 26-30 August 2018, Budapest, Hungary:
<http://www.ieee-pemc2018.org/>
- **EPE 2018 ECCE Europe, 17 – 21 September 2018, Riga, Latvia:**
<http://www.epe2018.com>
- 2018 IEEE Energy Conversion Congress and Exposition (ECCE) – 23-27 September 2018, Portland, USA
<http://www.ieee-ecce.org/2018/>
- 29th European Symposium on Reliability of Electron Devices, Failure Physics and Analysis, ESREF 2018, Aalborg, Denmark – 1-5 October 2018
<http://www.esref2018conf.org/>

2019:

- ICPE 2019 – ECCE Asia, 27-31 May 2019 Busan, Korea (South)

<http://www.icpe2019.org/>

- LDIA 2019, 1-3 July 2019 at MICROCITY EPFL Neuchatel, Switzerland

<https://ldia2019.epfl.ch/>

- EPE 2019 ECCE EUROPE, 2 - 6 September 2019, Genova, Italy

<http://www.epe2019.com/>

2020:

- EPE 2020 ECCE EUROPE, 7-11 September 2020, Lyon, France

2021:

- EPE 2021 ECCE EUROPE, 6-10 September 2021, Ghent, Belgium

2022:

- EPE 2022 ECCE EUROPE, 5-9 September 2022, Hanover, Germany

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