



The EPE Conference Committee invites you to come to **EPE'17 ECCE Europe**

**The 19<sup>th</sup> European Conference on Power Electronics and Applications** (and Exhibition) will be held in **Warsaw, Poland, from 11 to 14 September 2017**

Please have a look at

**PROVISIONAL PROGRAMME** → <https://wd.cborg.info/EPE2017/program.html> ←

**REGISTRATIONS** → <https://wd.cborg.info/EPE2017/> ←

Registration rates: <http://www.epe2017.com/pl/registration>

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## I. EXHIBITION

### 1 OUR SPONSORS

Our Silver Sponsor:



**TRUMPF Hüttinger**  
generating confidence

**TRUMPF Huettinger** is a leading global manufacturer of process power supplies for plasma applications, induction heating, and CO2 laser excitation. TRUMPF Huettinger has been part of the TRUMPF Group since 1990.

Our Brown Sponsor:



### 2 OUR EXHIBITORS

EPE ECCE Europe is the most important Conference in the field and will be THE meeting place for power electronics specialists: system designers, users and application engineers, offering the perfect stage for personal relationships between companies and professionals.

For this edition, we welcome in Warsaw:

Allatherm  
AMS Technologies  
Dacpol  
dSPACE & Technika Obliczeniowa  
ECPE  
EGSTON  
Electronic Concepts  
EPE'18 – Riga & EPE'19 – Genova  
HBM Test & Measurement  
HIOKI E.E. Corporation  
HVP High Voltage Products  
IEEE-PELS  
imperix  
Keysight Technologies  
Leclanché Capacitors & FT Cap & SRT-Microcéramique  
Linksiem – EPICUB-G2ELAB  
Magna-Power Electronics & Tespol  
MathWorks & Speedgoat

Mersen  
PCIM Europe  
National Instruments  
OPAL-RT  
PEM Power Electronic Measurements  
PGE - Polska Grupa Energetyczna  
Plexim  
Powersys  
Rhode & Schwarz  
Teledyne LeCroy  
Transfer Multisort Elektronik,  
Transphorm  
Triphase  
Trumpf Hüttinger  
TWERD Power Electronics  
Typhoon HIL  
Yokogawa

➡ More information on: <http://www.epe2017.com/pl/exhibitors> ⬅

➔ More information on: <http://www.epe2017.com/pl/tutorials> ←

At Warsaw University of Technology (Politechnika Warszawska)  
Centrum Zarządzania Innowacjami i Transferem Technologii (CZliTT)  
Ul. Rektorska 4, 00-614 Warsaw (Poland)

Tutorial 1 (morning):	<a href="#">High Power Medium Frequency Transformer Design</a>
Tutorial 2 (afternoon):	<a href="#">The GOOGLE Little Box Challenge - Ultra-Compact GaN- or SiC-Based Single-Phase DC/AC Power Conversion: Component Technologies / System Concepts / Performance Barriers / Future Technologies</a>
Tutorial 3 (full day):	<a href="#">Industry Best Practices in Reliability Prediction and Assurance for Power Electronics</a>
Tutorial 4 (full day):	<a href="#">Small-Signal Stability and Subsystem Interactions in Distributed Power Systems with Multiple Converters</a>
Tutorial 5 (full day):	<a href="#">Predictive Control - A Powerful Method to Control Power Converters and Drives</a>
Tutorial 6 (full day):	<a href="#">Lithium-ion Battery Systems and Power Electronics Solutions for Stationary and E-mobility Applications</a>
Tutorial 8 (morning):	<a href="#">DC distribution grids: Providing comprehensive tools for a more efficient and reliable design</a>
Tutorial 9 (afternoon):	<a href="#">EMC design fundamentals and EMI mitigation techniques in high power converters</a>

### III. KEYNOTES

➔ More information on: <http://www.epe2017.com/pl/keynotes> ←

Keynote 1:	Tuesday 12/9	<a href="#">Zbigniew Hanzelka</a> - AGH University of Science and Technology, Poland « Power Quality – An Essential Element of Today’s Quality of Life »
Keynote 2:	Wednesday 13/9	<a href="#">John Palmour</a> - Wolfspeed, US « Current Status of High Voltage SiC Devices »
Keynote 3:	Wednesday 13/9	<a href="#">Per Ranstad</a> - GE Power Sweden AB, Sweden « On Experiences of SiC Power Components in Industrial Converters »
Keynote 4:	Thursday 14/9	<a href="#">Alfred Rufer</a> - EPFL, Switzerland « The Dream of Efficient Energy Storage – From BESS, KERS & Co to the Hybrid Power Plant »

➤ More information on: <http://www.epe2017.com/pl/technical-visits> ➤

➤ **Tour 1: Power generation solutions for plasma processes**

**Maximum 40 participants - Registration possible until September 1<sup>st</sup>**

On this tour we will visit TRUMPF Hüttinger, a leading global manufacturer of power supplies for plasma based coating processes, induction heating and CO2 laser excitation. TRUMPF Hüttinger has development and production sites in Poland, Germany and the USA. The tour will guide us to the plant in Zielonka n/Warsaw, a DC Competence centre of TRUMPF Hüttinger, which in order to meet the latest criteria for efficiency and quality constantly expands its premises.

The company's products supply the required process energy in many high-tech industries; plasma generators from TRUMPF Hüttinger support the functional coating of solar cells and microchips, among other applications. The company is the market leader in coating processes for manufacturing flat screens and architectural glass. TRUMPF Hüttinger induction generators cover a broad application spectrum ranging from classic applications such as hardening, annealing and soldering to high-tech processes like crystal growing.

The tour will start at 9:30AM and is expected to end in the afternoon between 2:00 PM and 3:00 PM at the Palace of Culture and Science.

➤ **Tour 2: ABB ENVILINE™ DC wayside Energy Storage System – the first European Energy Storage System in Subways & the Power Electronics and Applications Research laboratories of the Warsaw University of Technology**

Due to the great success of this technical visit (the initially foreseen 30 places were sold VERY fast), we are proud to announce that, if enough people register, there will be a **second tour in the afternoon**

**Maximum 2 x 30 participants (1 group in the morning, 1 group in the afternoon) - Registration possible until September 1<sup>st</sup>**

On this tour we will visit the ABB ENVILINE™ Energy Storage System (the first European Energy Storage System in Subways and the largest of its kind in the world) and the Power Electronics and Applications Research laboratories of the Warsaw University of Technology (WUT).

The tour will start at the WUT with a short presentation about the ABB ENVILINE™ Energy Storage System. After that, the tour will take us, by the Warsaw Subway, to the Stadion Narodowy Subway line 2 substation, where the ENVILINE Energy Storage System is installed. Subway line 2 is one of the largest projects in Warsaw. The central section of the line is 6.1 km long and links the eastern Praga district with the downtown and western districts via a tunnel running eight meters below the Vistula river. The line, an investment of around one billion Euro, was opened in March 2015 and serves about 100,000 commuters per day since. The central section of Warsaw's Subway line 2 is powered by seven underground substations - installed by ABB - providing DC traction power to the line and AC auxiliary power to the Subway stations. Four combined traction and auxiliary substations are equipped with four transformer-rectifier groups each to ensure redundancy and uninterrupted power supply, while the remaining three AC substations provide high-quality power to stations and commercial loads. To improve the ecological footprint of the new east-west connection, the Stadion Narodowy substation is equipped with a super-capacitor-based DC wayside Energy Storage System. The 40-megajoule system recovers and stores braking energy from decelerating subway trains and makes it available again for acceleration. This special feature helps to reduce operating costs, while enhancing energy efficiency.

After this interesting visit, the tour will guide us back to the WUT, where the most interesting and important Power Electronics and Applications Research laboratories will be shown. Recent achievements in the field of Power Electronics and Applications will be presented by the members of our scientific teams from the Institute of Control and Industrial Electronics (ICIE). The teams from the Industrial Electronics Division and the Electrical Drives Division of ICIE are currently involved in the Projects related to renewable energy sources, intelligent solutions for smart grids, electric vehicles, light aircrafts, and others. Selected solutions in these fields will be shown to the tour participants.

**ATTENTION:**

The tour will be organized in two groups:

1. People who registered for this tour before July 18, 2017, will join the tour in the morning.
2. **People who register(ed) for this tour on July 18 or later, will join the tour in the afternoon.**

The morning tour will start at 9:00 AM and is expected to end in the afternoon (after lunch) between 1:30 PM and 2:00 PM, both at the Warsaw University of Technology.

The afternoon tour will start with lunch at 1:00 PM and is expected to end between 5:30 PM and 6:00 PM, both at the Warsaw University of Technology.

Suitable shoes are required for this tour.

### ➤ Tour 3: **Extraordinary sightseeing tour of Warsaw**

**Maximum 50 participants - Registration possible until September 1<sup>st</sup>**

#### **Itinerary**

9:00	Meeting in front of the main entrance of the Palace of Science & Culture (Conference place)
9:00 - 9:20	Transfer to the Royal Łazienki Park
9:20 - 10:00	Łazienki Royal Park sightseeing (walking tour)
10:00 - 11:30	Panoramic tour around main spots in Warsaw
11:30 - 13:00	Old Town Sightseeing (walking tour)
13:00	Lunch time the Old Town area (not included in the price of tour)

#### **Highlights**

*Grand Theatre - National Opera:* One of the most modern theatres in Europe, and the largest stage in the world.

*The Presidential Palace* is one of the largest palaces in Warsaw. This is the official seat of the President of the Republic of Poland.

Walking down the streets of *the Old and New Towns* allows you to rest from the bustle of central city life. Atmospheric alleys, squares, and cosy cafés create a unique sense of history, and in the summer, the Old and New Town Squares become stages for musical and theatrical performances and open-air galleries.

*The Royal Castle* was built in the 15<sup>th</sup> century. It served as residence of Mazovian princes. Once the capital was moved from Krakow to Warsaw, the castle served as seat of the king and the Parliament. The castle has been renovated repeatedly and destroyed completely during World War II. It was rebuilt between 1971-1988 using castle remains and rubble. Today, the segment with the clock tower opens the way to the Old Town.

*The cathedral Basilica of St. John the Baptist* was erected in its present form in the 14<sup>th</sup> century. It has witnessed many historic events, including weddings, coronations and royal funerals.

*Barbican:* An example of "defense construction", this is a part of the city walls built in the 16<sup>th</sup> century. Almost being completely destroyed during World War II, it was restored after the war ended.

*Łazienki Park & Palace on the Water:* Łazienki Królewskie Museum is a Palace-Garden complex which includes a park (76 hectares of nature, right in the city center) and numerous historical objects. The park was created using the formerly wildly growing forest, allowing the animals to be "detained" under natural conditions. In the 18<sup>th</sup> century it became the most beautiful planned area in Warsaw and one of the most beautiful in Europe, equally stunning in terms of its greenery and architecture.

**The tour is mostly walking, so suitable shoes are required.**

→ More information on: <http://www.epe2017.com/pl/ieee-pels-workshop-warsaw> ←

### IEEE-PELS Workshop: “Interlock times – necessary, useful or not needed at all?”

The workshop is organized and financially sponsored by IEEE-PELS (Power Electronics Society – TC 1) and will take place on **Sunday, September 10, 2017** from 10:00 AM until 04:00 PM, followed by a dinner at 06:00 PM

**At Warsaw University of Technology (Politechnika Warszawska)**  
**Centrum Zarządzania Innowacjami i Transferem Technologii (CZliTT)**  
**Ul. Rektorska 4, 00-614 Warsaw (Poland)**

The workshop will be on the Sunday before the EPE 2017 ECCE Europe, which is also to take place in Warsaw (Poland). This enables all participants of the workshop to combine their travel with the travel to EPE 2017 ECCE Europe. The workshop will not charge any participation fee – the on-site expenses are completely sponsored by TC1 from IEEE-PELS.

You are invited to attend and to contribute to this workshop by your experience.

During my industrial activities at the Robert BOSCH company, I learned to use interlock times between the switching off of one power semiconductor in an inverter leg before switching on the opposite one. My opinion always was, that the so-called tail current has to be vanished before switching on the opposite semiconductor. In the following time, I taught all my students, that the interlock times are necessary to avoid destruction of the inverter by a so-called shoot through.

Recently we supervised a Master Thesis at the Technical University of Munich to find out, how far one can shorten the interlock times (to reduce the non-linearities of the inverter in the low voltage region). The surprising results of the Master Thesis showed, that it is not necessary to wait until the tail current has vanished - the opposite semiconductor can be switched on while the tail current is still flowing. We even could reduce the interlock time to 0 without destroying the inverter.

In the paper “Multilevel Bipolar High Voltage Pulse Source - Interlock Dead Time Reduction” (published 2003), the author found out the H-bridge works properly when the interlock dead time is set to 1.3 $\mu$ s. He didn't reduce the delay time further because he could only select from five different values (0 $\mu$ s, 1.3  $\mu$ s, 2.3  $\mu$ s, 3.3  $\mu$ s and 4.3  $\mu$ s) of the delay time predefined by the gate driver he used... And the circuit works properly.

I was also surprised to read a contribution from Allen Hefner from 1996 – we all know him. In the paper “IGBT half-bridge shoot-through characterization for model validation”, the author conducted a series of experiments that are almost the same as we have done within the Master Thesis at the TUM. But the load he used is resistive and the circuit is half-bridge. The collector current suffers a “bump” in the current when one IGBT turns on during the tail current of the other one, but this doesn't affect the proper working of the circuit. We confirmed this phenomenon on our own experimental circuit with resistive load.

The idea of the workshop is to have an open discussion and an exchange of experiences. Only a few presentations should break the ice and trigger the open talks.

If you are interested in doing one of the introductory presentations (5 to 10 minutes – not more), please give me respective feedback directly on my email [kennel@ieee.org](mailto:kennel@ieee.org) – we try plan respectively.

We do not plan to upload papers and/or presentation slides to any type of proceedings. We want to keep the participants free from any pressure to participate and contribute freely. We might produce an article for PELS magazine or a similar magazine, but we do not intend to include secrets from any company.

If you want to participate in the workshop, please register on-line via the website <http://www.eal.ei.tum.de/en/start/> using the link ‘IEEE-PELS Workshop 2017 „Interlock Times - ...”’.

Expecting your participation with interest,

Sebastian Styński, Technical University of Warsaw  
Ralph Kennel, Technical University of Munich  
Rolando Burgos, Virginia Tech

## VI. EXTRA NETWORKING OPPORTUNITIES

### 1 THE WELCOME RECEPTION

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Date: **Tuesday, September 12<sup>th</sup> at 6:00 PM**  
**Exhibition Room**

Around a drink in the exhibition room, you can meet the EPE'17 delegates and exhibitors.  
You will also discover and enjoy **The BIBLIOTEQ MDULAIR & SYNKIE**:

*“When obsolete laboratory devices meet sound and video: Welcome party experimental audiovisual performance with Biblioteq Mdulair and Synkie from Switzerland.*

*With its oscilloscopes, sinusoidals, and frequency sweeps, BIBLIOTEQ MDULAIR is a sound installation made of analogue function generators producing all kind of waveforms, exploring vibrations, tickling resonances, and creating breathing beats.*

*SYNKIE is an analogue ecosystem for video manipulation created by [ a n y m a ]. This modular video synthesiser stands as the perfect alter-ego of legendary Moog and works as a true analogue processor for distributing moving images on dozens of CTR televisions.”*

More information: <http://ooo.szkm.ooo/biblioteq-mdulair-baltic-tour/>

### 2 IEEE YP MEET-UP @ EPE'17 – ECCE EUROPE

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Date: **Tuesday, September 12<sup>th</sup>, after the Welcome Reception at 8:00 PM**  
**Centre of Innovations and Technology Transfer Management of Warsaw University of Technology**



The Young Professionals Meet-up will take place on Tuesday, 12 September, right after the Welcome Reception. It will be held at 20:00 hours (8PM) in the Centre of Innovations and Technology Transfer Management of Warsaw University of Technology (4 Rektorska St., ground floor), located about 1,5 km south of the Conference place.

#### **You are invited!**

**An opportunity to mingle, interact, learn from the best minds of IEEE and IEEE Power Electronics Society (PELS) and have some fun!** IEEE Power Electronics Society (PELS) and IEEE Poland Section cordially invite you to join this event to learn from the life journey of the biggest leaders in power electronics at EPE'17 – ECCE Europe along with an evening well spent talking to people from across the globe.

This year, the IEEE PELS Students and Young Professionals and the IEEE Young Professionals Affinity Group (AG) from Poland Section will jointly host this event – IEEE YP Meeting @ EPE'17 – ECCE Europe. It will specially be filled with distinguished 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 don't miss this wonderful chance to make new friends and meet new people.

Please register until **1<sup>st</sup> of September 2017** at <https://goo.gl/ZcDYFU> to mark your presence for this amazing evening at EPE'17 – ECCE Europe in Warsaw.

IEEE PELS Students and Young Professionals Committee  
IEEE Poland Section Young Professionals AG Committee

### 3 THE GALA DINNER

Date: **Wednesday, September 13<sup>th</sup> at 7:00 PM**  
**KUBICKI ARCADES**

The Gala Dinner will take place in the **KUBICKI ARCADES**: Arkady Kubickiego, Plac Zamkowy 4, 00-001 Warszawa. Dinner will start at 7:00 PM with welcome drinks on the terrace above the entrance to the Arcades.

The Arcades are located within a 30 minute walk from the Palace of Culture and Science.

There is also the possibility to use public transportation – bus number 160 will take you from station *Sala Kongresowa 09* directly to the *Zamek królewski 01*.

This beautiful and monumental building is located in the Castle's gardens, which are gradually being restored. It's new role makes reference to the Arcades' original use (since Kubicki intended to be the street used for trading purposes). There will also be the additional attraction of entering the Royal Castle by escalator.



● The Royal Castle in Warsaw – Museum - The Kubicki Arcades



● The Royal Castle in Warsaw – Museum - The Kubicki Arcades



● The Royal Castle in Warsaw – Museum - The Kubicki Arcades



● The Royal Castle in Warsaw – Museum - The Kubicki Arcades

## VII. THE CONGRESS CENTRE

In the “7 wonders of Warsaw” contest, announced near the end of 2009, **the Palace of Culture and Science** finished in second place. The Palace of Culture and Science is a home to The Youth Palace, Kinoteka cinema and Dramatic, Studio, Lalka and 6<sup>th</sup> Floor theatres, as well as to the Museum of Technology and the Museum of Evolution. We invite those exhausted by the attractions to the highest-located observation platform in Europe, where with a cup of excellent cappuccino, one can admire the panorama of Warsaw (in the summer and before holidays even until late night hours).



The Palace is located in the very Centre of the capital, on the crossroads of all major traffic arteries. Therefore, the Palace of Culture and Science is visible from nearly every spot in the city, which makes navigation extremely easy.

For more info about the Palace of Culture and Science, please have a look at <http://www.pkin.pl/eng> and [https://en.wikipedia.org/wiki/Palace\\_of\\_Culture\\_and\\_Science](https://en.wikipedia.org/wiki/Palace_of_Culture_and_Science)

## VIII. FUTURE EPE ECCE EUROPE AND TECHNICALLY SPONSORED CONFERENCES

2017

**LDIA 2017**, 6-8 September 2017, Osaka, JAPAN, <http://www.ldia.jp>

**ECCE North America**, 2 to 5 October 2017, Cincinnati, USA, <http://www.ieee-ecce.org/2017/>

2018



**EPE 2018 ECCE EUROPE**

17-21 September 2018, Riga, LATVIA

<http://www.epe2018.com>

**IPEC - INTERNATIONAL POWER ELECTRONICS CONFERENCE, ECCE Asia**, 20-24 May 2018, <http://www.ipec2018.org/>

**ECCE NA, 23-27 September 2018**, Oregon Convention Center, Portland, OR, US, [www.ieee-ecce.org](http://www.ieee-ecce.org)

2019



**EPE 2019 ECCE EUROPE**

2 - 5 September 2017, Genova, ITALY

<http://www.epe2019.com>