

## Registration (Fax Reply)

To: ECPE e.V.  
Att.: Ingrid Bollens, [Ingrid.bollens@ecpe.org](mailto:Ingrid.bollens@ecpe.org)  
Please **e-mail** a scanned copy of the completed form or  
send a fax to: +49 (0)911 / 81 02 88 – 28

Register before **17 May 2012**

### Participation fee:

- ☐ €530,- \* for industry
- ☐ €395,- \* for universities/institutes
- ☐ €120,- \* for students (shortened workshop package)

The fee includes dinner, lunch, coffee/soft drinks and a CD with the workshop presentations. A printed version of the workshop handout is available on request (€42,-\*).

With the confirmation of registration you will receive the invoice. (\* plus VAT) In case of cancellation after 15 May 2012 or non-attendance 50 % of the participation fee are payable.

Three participants from each ECPE member company free of charge. Allocation in sequence of registration.

### Sender:

\_\_\_\_\_  
Title, given name, name

\_\_\_\_\_  
Company, department

\_\_\_\_\_  
Full address

\_\_\_\_\_  
Phone, fax

\_\_\_\_\_  
E-mail

\_\_\_\_\_  
Date, signature

F06 - 16.05.2012

## Organisational information

<b>Organiser</b>	ECPE e.V. 90443 Nuremberg, Germany <a href="http://www.ecpe.org">www.ecpe.org</a>
<b>Chairman</b>	Prof. Mark Bakran, University of Bayreuth Dipl.-Ing.(FH) Jochen Koszescha ECPE e.V.
<b>Organisation</b>	Ingrid Bollens, ECPE e.V. +49 (0)911 / 81 02 88 – 10 <a href="mailto:ingrid.bollens@ecpe.org">ingrid.bollens@ecpe.org</a>
<b>Workshop venue</b>	Kolping Akademie Kolpingplatz 1 97070 Wuerzburg Germany

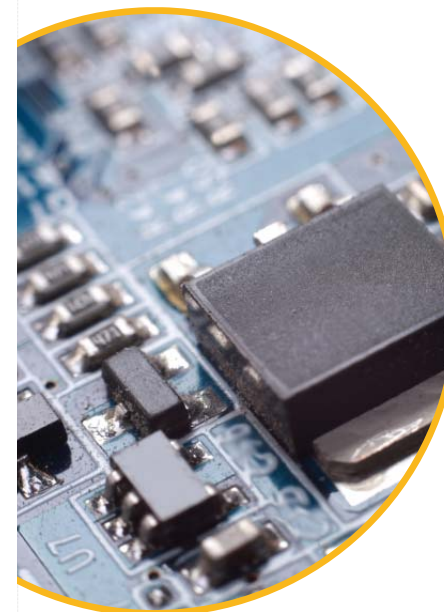


Further information (hotel list and maps) will be provided after registration.



## Programme ECPE Workshop

**Functional Safety in  
Industry Drives, Automotive and  
More-Electric-Aircraft Applications**



**22 – 23 May 2012**  
Kolping-Akademie  
Wuerzburg, Germany

In cooperation with



**UNIVERSITÄT  
BAYREUTH**



## ECPE Workshop

# Functional Safety in Industry Drives, Automotive and More-Electric-Aircraft Applications

22 – 23 May 2012  
Wuerzburg, Germany

New application fields of power electronics together with an increasing awareness of safety aspects lead to higher demands on a safe behaviour of power electronics. Most solutions today solve the safety issue with a combination of ‘unsafe’ power electronics and a safe control and monitoring. However, more critical applications like aircraft, X-by-wire functions or single wheel drives in automotive will necessitate also a power electronics actuator with either a continued function or at least a safe condition under failure.

This workshop will address the many aspects of this topic - from the component and the machine to the control and the complete system. On the one hand investigations of the failure modes of power devices will show the importance of measures for safe handling of a converter failure. The analysis of the behaviour of the mechanical actuator with a power electronics fault will give an impression of the mechanical consequences of an electrical fault. As an important part of the workshop, reports from specific application fields will illustrate the different requirements. Time is also reserved to discuss new aspects and necessary fields for improved safety in power electronics.

One aim of the workshop is to foster the understanding between the designers of power electronic devices and circuits, and the engineers responsible for system safety.

The workshop is chaired by Prof. M. Bakran (University of Bayreuth) and J. Koszescha (ECPE). All presentations and discussions will be in English.

## Programme

### Tuesday, 22 May 2012

9:30 Start of Registration / Welcome Coffee

10:30 **Welcome, Opening**  
M. Bakran, University of Bayreuth  
J. Koszescha, ECPE e.V.

#### Introduction

10:45 **Safety in Power Electronics – Requirements and Challenges**  
M. Bakran, University of Bayreuth

11:25 **Functional Safety Standards & Concepts**  
- Overview of ISO26262 & IEC61508  
- Safety, Availability and Reliability  
Ch. Temple, Freescale Semiconductor

11:55 **Discussion**

12:05 Lunch

#### Failure behaviour of Power Electronic Components

13:05 **Failure Modes in Power Electronics for Traction Drives**  
M. Helsper, Siemens Large Drives

13:35 **IGBT Protection and High Voltage Safety**  
M. Hornkamp, CT-Concept Technologie

14:05 **Power Module Failures - More Than Just End-of-Life Failures**  
U. Scheuermann, Semikron Elektronik

14:45 **Discussion**

14:55 Coffee Break

#### Application Requirement

15:25 **Controls and Drives with some Human Habits**  
P. Wratil, innotec GmbH

15:55 **Case Study: Operational Safety for Power Electronics (Automotive and Aerospace)**  
F. Schwamm, Schwamm Consulting / Silver Atena

16:10 **Case Study: The Relevance of Risk Analyses for the Power Electronics Parts of Safety Functions**  
M. Kaiser, SGS-TÜV GmbH

16:30 **HVDC-Applications**  
H. Gambach, Siemens Energy

17:00 **Discussion with Summary of the Day**

17:15 **End of 1st Day (TBC)**

19:30 Dinner at Restaurant “Bürgerspital Weinstuben”, Theaterstrasse 19, 97070 Würzburg

## Programme

### Wednesday, 23 May 2012

9:15 Start of 2nd Day

9:15 **Wrap up of 1<sup>st</sup> workshop day**

9:20 **Failure Mechanism of Capacitors and their Relevance for Functional Safety**  
W. Grimm, Epcos

9:50 **Panel Discussion: Requirements in different Applications**  
Moderation: J. Koszescha / M. Bakran

10:30 Coffee break

#### Power Electronic Topology for Safe Operation

10:50 **Comparison and Evaluation of different Topologies**  
M. Gleissner, University of Bayreuth

11:20 **Modular Charging and Battery Management System for Electric Vehicles with increased Safety Requirements**  
S. Staudt, J. Teigelkötter, University of Applied Science Aschaffenburg

11:50 **Discussion**

12:00 Lunch

#### Safe Control of Power Electronics

13:00 **Drive Based Safety Functions not Implementing the Idle Current Principle**  
Th. Winkowich, Siemens

13:30 **Processing Considerations in Power Electronic Systems**  
- Multi-Channel Systems from Sensor to Actuator  
- Integrated versus Discrete Safety Architectures  
- Networked versus Centralized Systems  
Ch. Temple, Freescale Semiconductor

14:00 **Discussion**

#### Interaction with Machines under Failure Conditions

14:10 **A Fault-Tolerant Flux-Switching Permanent Magnet Motor Drive**  
Mark Sumner, Chris Gerada, University of Nottingham

14:40 **Short Circuits and Failure Behaviour**  
S. Tegeler, B. Ponick, Leibniz University Hannover

15:10 **Final Discussion**

15:30 End of Workshop