Guest lectures:

Device- and Packaging Technologies for Future High Power Applications

by

Dr. Arnost Kopta, Head of BiMOS R&D at ABB Semiconductors in Lenzburg, Switzerland

and

The GOOGLE Little Box Challenge - Ultra-Compact GaN- or SiC-Based Single-Phase DC/AC Power Conversion

by

Prof. Dr. Johann W. Kolar, ETH Zurich, Switzerland

September 15 2017, 10:00 – 12:00

Aalborg University, Department of Energy Technology, Pontoppidanstræde 101, room 23
Guest lecture 1)

Outline
The presentation will give an overview of the latest achievements in the area of high voltage turn-off devices for converters in the power range beyond 5MW, covering both semiconductor and packaging aspects important for these demanding applications. Today, two device technologies are available in this power range depending on the application demands: The Integrated Gate Commutated Thyristor (IGCT) and the Insulated Gate Bipolar Transistor (IGBT). In this presentation, we will show the latest results as well as an outlook covering the future potential of SiC in these applications.

About the Lecturer
Dr. Arnost Kopta is Head of BiMOS R&D at ABB Semiconductors in Lenzburg, Switzerland. His technical background is more than 15 years of high voltage IGBT design and development.

Guest lecture 2)

Abstract
The GOOGLE Little Box Challenge was aiming to build the worldwide smallest air cooled 2kVA DC/AC converter and accordingly created a huge interest in the power electronics community and resulted in a massive performance improvement compared to state-of-the-art technology systems. This presentation explains the approach selected by the team of ETH Zurich / FH IZM / Fraza d.o.o. which includes the main power circuit topology, the buffering of the power pulsation with twice the output frequency, the EMI filter topology, and the modulation and control of the converter stages. Furthermore, concepts built by other finalists will be briefly described and comparatively evaluated. Finally, a new ultra-compact converter demonstrator, i.e. the Little Box 2.0 which pushes the power density to 250W/in³ (15kW/dm³) and exhibits 97.5% rated load efficiency will be presented. The talk is tailored to serve the interests of a broad audience with academic or industrial background.

About the Lecturer
Johann W. Kolar (IEEE Fellow) received his Ph.D. degree summa cum laude from the Vienna University of Technology, Austria. He is currently a Full Professor and the Head of the Power Electronic Systems Laboratory at the Swiss Federal Institute of Technology (ETH) Zurich. The focus of his research is on ultra-compact and ultra-efficient SiC and GaN converter systems, wireless power transfer, Solid-State Transformers, Power Supplies on Chip, as well as ultra-high speed and ultra-light weight drives, bearingless motors, and energy harvesting.