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PHD RESEARCH DAY 2015

ENERGY TECHNOLOGY

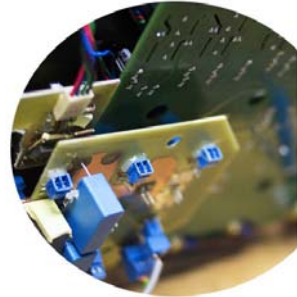
12 May 2015



**Department of Energy Technology
Aalborg University**

Location:

Fibigerstræde 16, Aalborg, Denmark



AALBORG UNIVERSITY
DENMARK

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PhD RESEARCH DAY 2015 - ENERGY TECHNOLOGY

The Energy Technology PhD programme is in a rapid and very strong progress and a lot of new PhD students have begun their amazing research work within the last year. The Department of Energy Technology has more than 100 PhD students enrolled. On May 12th, presentations from 70 PhD students will be carried out in three parallel sessions.

For PhD students, it is mandatory (except being abroad) to show up, both for presenting their research topic and to attend at least parts of the sessions. The research day is a part of fulfilling requirements for knowledge dissemination.

The Energy Technology research day presentations are subdivided into three parallel sessions:

- Session 1: Electrical Energy 1
- Session 2: Electrical Energy 2
- Session 3: Fluid Thermal Energy and Intelligent Energy Systems

Each session have sub-sessions, which are entitled by the titles of the research programs at Energy Technology and chaired by the research program leader. Each such sub-session contains 6 presentations selected from each individual research program activities.

We welcome you to the PhD Research Day 2015, which will be held on May 12, 2015 in Fibigerstraede 16, rooms 1.108, 1.101 and 1.111.

All are welcome. Staff members and industrial partners are encouraged to come and support our PhD students and discuss and ask questions.

Lunch and coffee will be served for those who register.

For registration, please contact one of the following persons:

- Hanne Munk Madsen, hmm@et.aau.dk
- Ana-Irina Stroe, ast@et.aau.dk
- Iulia Maria Daraban, imd@et.aau.dk

TECHNICAL COMMITTEE AND MANAGEMENT

Committee

Zhe Chen	“Wind Power Systems” Programme Leader
Jens Bo Holm-Nielsen	“Offshore Energy Systems”
Lasse Rosendahl	“Biomass” Programme Leader
Birgitte Bak-Jensen	“Intelligent Energy Systems” Programme Leader
Josep M. Guerrero	“Microgrids” Programme Leader
Samuel Simon Araya	“Fuel Cell and Battery Systems” Programme
Peter Omand Rasmussen	“E-mobility and Industrial Drives” Programme
Stig Munk-Nielsen	“Efficient and Reliable Power Electronics” Vice Programme Leader
Carsten Bojesen	“Green Buildings” Programme Leader

Management

Claus Leth Bak	Head of Energy Technology PhD Program
Hanne Munk Madsen	Information Officer
Ana-Irina Stroe	Ph.D. Fellow at Aalborg University
Iulia Maria Daraban	Ph.D. Fellow at Aalborg University

SCHEDULE AT A GLANCE

Tuesday, May 12th

<i>TIME</i>	<i>ACTIVITY</i>	<i>LOCATION</i>
08:00 - 08:30	PHD RESEARCH DAY OPENING	FIB. 16
08:30 - 10:00	ORAL SESSION	
	WIND POWER SYSTEMS 1	Room 1.108
	EFFICIENT AND RELIABLE POWER ELECTRONICS 1	Room 1.101
	INTELLIGENT ENERGY SYSTEMS	Room 1.111
10:00 - 10:30	COFFEE BREAK	
10:30 - 12:15	ORAL SESSION	
	WIND POWER SYSTEMS 2	Room 1.108
	EFFICIENT AND RELIABLE POWER ELECTRONICS 2	Room 1.101
	FUEL CELL AND BATTERY SYSTEMS	Room 1.111
12:15 - 12:45	LUNCH BREAK	
12:45 - 14:30	ORAL SESSION	
	EFFICIENT AND RELIABLE POWER ELECTRONICS 3	Room 1.108
	MICROGRIDS	Room 1.101
	BIOMASS	Room 1.111
14:30 - 15:00	COFFEE BREAK	
15:00 - 16:45	ORAL SESSION	
	E-MOBILITY + MODERN POWER TRANSMISSION	Room 1.108
	MICROGRIDS + OFFSHORE ENERGY SYSTEMS	Room 1.101
	GREEN BUILDINGS	Room 1.111
16:45- 17:30	CLOSING CEREMONY	Room 1.108

TECHNICAL PROGRAM

8:30 - 10:00	
WIND POWER SYSTEMS 1 Room 1.108	
Session Chair: Zhe Chen	
08:30	Modulation Schemes for Single-phase B6 Converters to Achieve Improve Performance Zian Qin; Poh Chiang Loh; Frede Blaabjerg
08:45	SCR Based Large Power and High Voltage Wind Turbine Energy Conversion System Haitao Liu; Zhe Chen; Fujin Deng
09:00	Dynamic Performance of DFIG Stator Flux during Consecutive Grid Voltage Variations Rongwu Zhu
09:15	DC-DC Converters Applied in MVDC and LVDC Networks Dong Liu; Fujin Deng
09:30	Integrated Inductor for Parallel Interleaved Voltage Source Converters Ghanshyamsinh Gohil; Remus Teodorescu; Tamas Kerekes
09:45	DAC to Mitigate the Effect of Periodic Disturbances on Drive Train using Collective Pitch for Variable Speed Wind Turbine Raja M. Imran; D. M. Akbar Hussain; Mohsen Soltani
EFFICIENT AND RELIABLE POWER ELECTRONICS 1 Room 1.101	
Session Chair: Stig Munk-Nielsen	
08:30	Loss Comparison of PWM Methods in LC-Filtered Wide Band Gap Based Adjustable Speed Drives Casper Vadstrup; Xiongfei Wang; Frede Blaabjerg
08:45	Circuit Mismatch and Current Coupling Effect in Power Module with Paralleled SiC MOSFETs Helong Li; Stig Munk-Nielsen; Toke Franke
09:00	Interharmonic Sources in Adjustable Speed Drive Application Hamid Soltani; Poh Chiang Loh; Frede Blaabjerg; Firuz Zare
09:15	High-Order Passive Filters for Grid-Connected Voltage-Source Converters: Topologies and Design Challenges Remus Beres; Frede Blaabjerg; Xiongfei Wang; Claus Leth Bak; Marco Liserre
09:30	Condition Monitoring for DC-link Capacitors based Artificial Neural Network Algorithm Hamam A. H. Soliman; Huai Wang; Brwene Gadalla; Frede Blaabjerg
09:45	Realization of Digital Differentiator Using Generalized Integrator Zhen Xin; Xiongfei Wang

TECHNICAL PROGRAM

INTELLIGENT ENERGY SYSTEMS		Room 1.111
Session Chair: Birgitte Bak-Jensen		
08:30	Economic Operation of Power Systems with Significant Wind Power Penetration Mostafa F. Astaneh; Zhe Chen; Weihao Hu	
08:45	Impedance Interaction in Cascaded Converter System Yanjun Tian; Zhe Chen	
09:00	Intelligent Control and Operation of Low Voltage Distribution Grids Bishnu Prasad Bhattacharai; Birgitte Bak-Jensen; Jayakrishnan Radhakrishna Pillai	
09:15	Data Management in Technical Virtual Power Plants (TVPPs) Konstantinos Kouzelis; Birgitte Bak-Jensen Jayakrishnan Radhakrishna Pillai; Iker Diaz de Cerio Mendaza	
09:30	Tilt Angle Optimization and Wind Cooling Effect of PV Panel Nuri Gökmen; Weihao Hu; Peng Hou; Zhe Chen; Dezso Sera; Sergiu Viorel Spataru	
10:30 - 12:15		
WIND POWER SYSTEMS 2 Room 1.108		
Session Chair: Zhe Chen		
10:30	Offshore Substation Locating in Wind Farms Based on Prim Algorithm Peng Hou; Weihao Hu; Zhe Chen	
10:45	Loss Minimizing Operation of Doubly Fed Induction Generator Based Wind Generation Systems Considering Reactive Power Provision Baohua Zhang; Weihao Hu; Zhe Chen	
11:00	Review of Voltage System Stability with High Wind Power Integration Rui Hu; Zhe Chen; Weihao Hu	
11:15	Optimal Active Power Control Method in Wind Farms Considering Wake Effect Jie Tian; Chi Su; Mohsen Soltani; Zhe Chen	
11:30	Malfunction Operation of LVRT Capability of Wind Turbines under Islanding Conditions Bakhtyar Hoseinzadeh; F. Faria Da Silva; Claus Leth Bak	
11:45	Integrated Energy Flow Analysis in a Harmonized Natural Gas and Electricity Network with Bi-directional Energy Conversion Qing Zeng; Jiakun Fang; Zhe Chen; Jinghua Li	
12:00	Case Study of Ice Sensor using Computational Dynamics, Measurements and Pictures Marie Cecilie Pedersen; Chungen Yin	

TECHNICAL PROGRAM

EFFICIENT AND RELIABLE POWER ELECTRONICS 2		Room 1.101
<i>Session Chair: Stig Munk-Nielsen</i>		
10:30	Ageing Monitoring in IGBT in a Converter Operation <i>Pramod Ghimire; Bjørn Rannestad; Stig Munk-Nielsen</i>	
10:45	Stabilization of Multiple Unstable Modes for Small-Scale Inverter-Based Power Systems with Impedance-Based Stability Analysis <i>Changwoo Yoon; Claus Leth Bak</i>	
11:00	Design of LLCL-Filter for Grid-Connected Converter to Improve Stability and Robustness <i>Min Huang; Xiongfei Wang; Poh Chiang Loh; Frede Blaabjerg</i>	
11:15	Advanced Active Power Cycling Test <i>Uimin Choi; Frede Blaabjerg</i>	
11:30	3D Thermal Model for High Power Modules Considering Multi-layer Thermal Coupling <i>Amir Sajjad Bahman; Ke Ma; Frede Blaabjerg</i>	
11:45	Electro-Thermal Modeling of High Power IGBT Module Short Circuits with Experimental Validation <i>Rui Wu; Frede Blaabjerg</i>	
FUEL CELL AND BATTERY SYSTEMS		Room 1.111
<i>Session Chair: Samuel Simon Araya</i>		
10:30	H ₂ starvation on the PBI/H ₃ PO ₄ HT-PEM Fuel Cell <i>Fan Zhou</i>	
10:45	Novel Battery Thermal Management System for Greater Lifetime Ratifying Current Quality and Safety Standard <i>Mohammad Rezwana Khan</i>	
11:00	Characterization of High Temperature PEM Fuel Cell with Residual Methanol and Water Vapor Mixture <i>Sobi Thomas; Søren Knudsen Kær; Samuel Simon Araya</i>	
11:15	The Path for an Advanced Management System for Lithium-Sulfur Batteries <i>Václav Knap; Remus Teodorescu; Daniel-Ioan Stroe</i>	
11:30	Advanced Battery Management for Li-ion batteries <i>Jorge Varela Barreras; Maciej Swierczynski; Erik Schaltz; Søren Juhl Andreasen</i>	
11:45	Accelerated Lifetime Testing of Lithium Ion Batteries <i>Ana-Irina Stroe</i>	

TECHNICAL PROGRAM

12:45 - 14:30		
EFFICIENT AND RELIABLE POWER ELECTRONICS 3		Room 1.108
<i>Session Chair: Stig Munk-Nielsen</i>		
12:45	Design of Low Impedance Busbar for 10 kV, 100A 4H-SiC MOSFET Short-Circuit Tester using Axial Capacitors <i>Emanuel P. Eni; Tamas Kerekes; Christian Uhrenfeldt; Remus Teodorescu Stig Munk-Nielsen</i>	
13:00	Robustness of MW-level IGBT Modules under Short Circuit Events <i>Paula Diaz Reigosa; Francesco Iannuzzo</i>	
13:15	Harmonic Interaction Analysis in Grid Connected Converter using Harmonic State Space (HSS) Modeling <i>Jun Bum Kwon; Frede Blaabjerg</i>	
13:30	Energy Harvesting via Dielectric ElectroActive Polymer Generators <i>Emmanouil Dimopoulos; Stig Munk-Nielsen</i>	
13:45	Passivity Improvement of Grid-Connected Converters with Integrated Active Damper <i>Haofeng Bai; Xiongfei Wang</i>	
14:00	Junction Temperature Measurement using Peak Gate Current <i>Nick Baker; Stig Munk-Nielsen; Marco Liserre</i>	
MICROGRIDS		Room 1.101
<i>Session Chair: Josep M Guerrero</i>		
12:45	Coordinated Control and Management of Distributed Energy Storage System for Islanded Microgrids <i>Nelson L. Diaz; Josep M. Guerrero</i>	
13:00	Energy Management System in Microgrids <i>Adriana C. Luna; Josep M. Guerrero</i>	
13:15	Low Voltage DC Microgrids <i>Enrique R. Díaz; Juan C. Vasquez; Josep M. Guerrero</i>	
13:30	Leakage Current Suppression with A Novel Six-Switch Photovoltaic Grid-Connected Inverter <i>Baoze Wei; Josep M. Guerrero; Mehdi Savaghebi; Xiaoqiang Guo</i>	
13:45	Protection of AC and DC Microgrids: Challenges and Solutions <i>Siavash Beheshtaein; Josep M. Guerrero; Mehdi Savaghebi</i>	
14:00	Provision of Flexible Load Control by Multi-Flywheel-Energy-Storage System in Electrical Vehicle Charging Stations <i>Bo Sun; Tomislav Dragicevic; Francisco Freijedo; Juan C. Vasquez; Josep M. Guerrero</i>	

TECHNICAL PROGRAM

BIOMASS		Room 1.111
<i>Session Chair: Lasse Rosendahl</i>		
12:45	Modelling the Dynamic Behaviour of Cloth Objects using a Discrete Particle System Approach <i>Anna Lyhne Jensen; Henrik Sørensen; Lasse Rosendahl</i>	
13:00	The Potential of Straw for Biogas Production in the European Union <i>Ane K. P. Meyer; Jens Bo Holm-Nielsen</i>	
13:15	Pretreatment of Lignocellulosic Biomass for Continuous Processing in Hydrothermal Liquefaction System <i>Iulia M. Daraban; Lasse Rosendahl; Thomas Helmer Pedersen</i>	
13:30	Effects of Composition on Optimal Process Conditions and Bio-Oil Yield <i>Ionela F. Grigoras; Lasse Rosendahl</i>	
13:45	Production of Fuel Range Oxygenates and Chemicals by Supercritical Hydrothermal Liquefaction of Lignocelluloses <i>Thomas H. Pedersen; Lasse Rosendahl</i>	
14:00	Co-processing Potential of HTL Bio-crude at Refineries - A Parametric Hydrotreating Study <i>Claus Uehnholt Jensen; Jessica Hoffmann; Lasse Rosendahl</i>	
14:15	Dynamic Biogas Upgrading for Integration of Renewable Energy from Wind, Biomass and Solar <i>Lars Jürgensen; Jens Bo Holm-Nielsen; Jens Born</i>	
15:00- 16:45		
E-MOBILITY AND INDUSTRIAL DRIVES + MODERN POWER TRANSMISSION		Room 1.108
<i>Session Chair: Peter Omand Rasmussen</i>		
15:00	Wireless Power Transfer to Vehicles <i>Tushar Batra; Erik Scholtz</i>	
15:15	Optimization of Voice Coil Actuator for Fast Switching Large Flow Hydraulic Valve <i>Christian Nørgård; Michael M. Bech; Daniel B. Rømer</i>	
15:30	Analysis of Convergence Problem in Initial Position Detection of Permanent Magnet Synchronous Machines under High Frequency Injection <i>Yang Feng; Kaiyuan Lu; Dong Wang</i>	
15:45	Development of Synchronous Reluctance Machine <i>Qian Wu; Kaiyuan Lu</i>	
16:00	Marine Power Systems: Grid Topologies and Protection Strategies <i>Catalin Iosif Ciontea</i>	

TECHNICAL PROGRAM

16:15	Aesthetic Improvement of Overhead Lines Using Composite Cross-arms and Fully Composite Pylons <i>Tohid Jahangiri; Claus Leth Bak; Filipe Faria Da Silva, Brian Endahl</i>	
16:30	Losses in Three Core Armoured Cables <i>Thomas Ebdrup</i>	
MICROGRIDS + OFFSHORE ENERGY SYSTEMS		Room 1.101
<i>Session Chair: Jens Bo Holm-Nielsen</i>		
15:00	Adaptive Distance Protection for Microgrids <i>Hengwei Lin; Josep M. Guerrero</i>	
15:15	Frequency Stability of Hierarchically Controlled Hybrid Photovoltaic-Battery-Hydropower Microgrids <i>Yajuan Guan; Juan C. Vasquez; Josep M. Guerrero; Wei Feng; Yibo Wang</i>	
15:30	Modular Plug'n'Play Control Architectures for Three-phase Inverters in UPS Applications <i>Chi Zhang; Josep M. Guerrero</i>	
15:45	An Overview of Module Integrated Converters for Photovoltaic Modules <i>Ghulam Mustafa Shoro; Deszo Sera; D. M. Akbar Hussain</i>	
16:00	Design of an Attitude and Heading Reference System for Marine Satellite Tracking Antenna <i>Yunlong Wang; Mohsen Soltani; Akbar Hussain</i>	
GREEN BUILDINGS		Room 1.111
<i>Session Chair: Carsten Bojesen</i>		
15:00	New Guidelines in the Search Towards the Optimal Working Fluids for Organic Rankine Cycles <i>Jakob Hærvig; Kim Sørensen; Thomas J. Condra</i>	
15:15	Minimization of Losses in Low-Temperature District Heating <i>Maksym Kottenko; Carsten Bojesen</i>	
15:30	Modelling and Development of Innovative Dual-Mode SmartGrid Heat Pump with HP2Grid Functionality <i>Carolina Carmo; Mads P. Nielsen</i>	

PhD Research Day 2015 - Energy Technology

PROGRAM

	SESSION 1 ELECTRICAL ENERGY FIB. 16, Room 1.108	SESSION 2 ELECTRICAL ENERGY FIB. 16, Room 1.101	SESSION 3 INTELLIGENT AND FLUID/THERMAL ENERGY SYSTEMS FIB. 16, Room 1.111
8:30 - 10:00	Wind Power Systems 1	Efficient and Reliable Power Electronics 1	Intelligent Energy Systems
COFFE BREAK			
10:30 - 12:15	Wind Power Systems 2	Efficient and Reliable Power Electronics 2	Fuel Cell and Battery Systems
LUNCH BREAK			
12:45 - 14:30	Efficient and Reliable Power Electronics 3	Microgrids	Biomass
COFFE BREAK			
15:00 - 16:45	E-mobility and Industrial Drives - Modern Power Transmission Systems	Microgrids - Offshore Energy Systems	Green Buildings
CLOSING CEREMONY FIB. 16, ROOM 1.108			

