Erik Schaltz
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AAU Energy
The Faculty of Engineering and Science
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E-Mobility and Drives
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Research profile

Erik Schaltz received the M.Sc. and Ph.D. degrees in electrical engineering from the Department of Energy, Aalborg University, Aalborg, Denmark, in 2005 and 2010, respectively. From 2009 to 2012 he has been an Assistant Professor at the Department of Energy, Aalborg University, and he is currently an Associate Professor at the same place.
At the Department, he is the group leader of the research programme in E-mobility and Drives.
He is a guest and associate editor in several journals related to batteries and e-mobility. His research interests include the usage of power electronics, electric machines, fuel cells, batteries, ultracapacitors, etc. in electric and hybrid electric vehicles. In addition, he is also focused on battery state-estimation, management (electric and thermal), and modelling (electric, thermal, and lifetime) of battery cells and packs.

Current Position

I am working as an Associate Professor at the Department of Energy at Aalborg University. My primary tasks involve teaching and project supervision of students on the Bachelor and Master Programme in Electrical Energy Engineering, and research and PhD supervision in the fields of electro-mobility and batteries.
At the department, I am the coordinator for the 4th and 5th semester studies, Internship Coordinator at the Bachelor Programme in Sustainable Energy Engineering, and Leader of the E-Mobility and Drives Research Group.
I'm often involved in assessment of PhD theses both internally and externally. In addition, I'm also often involved in assessment of candidates for various positions at the department, i.e., research assistants, PhDs, postdocs, assistant professors, and associate professors.

University Career

2012 - Present: **Associate Professor**, Department of Energy Technology, Aalborg University.
2009 - 2012: **Assistant Professor**, Department of Energy Technology, Aalborg University.
2008 - 2009: **PostDoc**, Department of Energy Technology, Aalborg University.
2005 - 2008: **PhD student**, Department of Energy Technology, Aalborg University, Denmark.
2005 - 2005: **Research Assistant**, Department of Energy Technology, Aalborg University.

Education

2022 - 2023: **Leading Research Groups at Aalborg University.** Organized by Lead.
2010 - 2012: Course in **University Pedagogy** for Assistant Professors.
2005 - 2010: **PhD degree**, Electrical and Electronic Engineering, Department of Energy Technology, Aalborg University, Denmark. Thesis title: Design of a Fuel Cell Hybrid Electric Vehicle Drive System.
2000 - 2005: **MSc Electrical Engineering**, Department of Energy Technology, Aalborg University, Denmark, Specialization: Power Electronics, Electric Machines and Drives. Thesis title: Sesorless Control of an IPMSM for Hydraulic Pump Application.
1997 - 2000: **Mathematical Student**, Bjerringbro Gymnasium.

PhD Supervision

2018 - 2022: **Design and Control of a Bearingless Double U-CoreSwitched ReluctanceMachine Used for a Flywheel,** Fariba Shakibapour
2018 - 2022: **Battery StateEstimation Methods for Electric Vehicles under Real Temperature Conditions**, Alejandro Gismero Galiatsatos
2015 - 2021: **A Systematic Approach for Thermal Analysis of Lithium Titanate OxideBatteries**, Seyed Saeed Madani
2014 - 2017: **Thermal and Reliability Investigation of Buck-Boost Power Converters**, Brwene Salah Abdelkarim Gadalla
2013 - 2016: **Battery Management Systems for Li-ion battery packs**, Jorge Varela Barreras

2013 - 2016: **Power Electronics for Oxide-based High Temperature Thermoelectric Generators**, Elena Anamaria Man
2012 - 2015: **Magnetic Coupling of Wireless Charging Systems for Electric Vehicles**, Tushar Batra

Board Memberships

2016 - present: Board member of the Danish Battery Society
2013 - 2015: Advisory Board Member of the Danish E-Mobility Business Cluster operated by Insero

Editorial Positions

2022 - 2023: Track Chair of Recent Results at Vehicle Power Propulsion Conference (VPPC)
2021 - 2022: Guest Editor in Electronics in Special Issue on Applications of Batteries and Ultracapacitors in Electric or Hybrid Vehicles
2019 - 2021: Guest Editor in Energies in Special Issue on Energy Storage Systems for Electric Vehicles
2017 - 2018: Guest Editor in Batteries in Special Issue on Battery Integration and Operation in Electro-Mobile Application
2012 - 2013: Guest Associate Editor in IEEE Transactions of Power Electronics in Special Issues on Transportation Electrification and Vehicle Systems

Prizes

Best Paper on Ecologial Vehicles
Barreras, J. V. (Recipient), Pinto, C. (Recipient), de Castro, R. (Recipient), Schaltz, E. (Recipient), Juhl Andreasen, S. (Recipient), Rasmussen, P. O. (Recipient) & Araujo, R. E. (Recipient), 5 Mar 2015

Best Paper on Ecological Vehicles
Schaltz, E. (Recipient), Stroe, D.-I. (Recipient), Nørregaard, K. (Recipient), Stenhøj Kofod, L. (Recipient) & Christensen, A. (Recipient), 9 May 2019

The ITS Outstanding Application Paper
Man, E. A. (Recipient), Sera, D. (Recipient), Máthé, L. (Recipient), Schaltz, E. (Recipient) & Rosendahl, L. A. (Recipient), 2 Jul 2015

Research outputs

Batterier og elbiler – Levetid og rækkevidde
Schaltz, E. (Producer), Sept 2021

Incremental Capacity Analysis Applied on Electric Vehicles for Battery State-of-Health Estimation
Schaltz, E., Stroe, D.-I., Nørregaard, K., Stenhøj Kofod, L. & Christensen, A., 1 Mar 2021, In: I E E E Transactions on Industry Applications. 57, 2, p. 1810-1817 8 p., 9328130.

Incremental Capacity Analysis for Electric Vehicle Battery State-of-Health Estimation
Schaltz, E., Stroe, D.-I., Nørregaard, K., Stenhøj Kofod, L. & Christensen, A., May 2019, *Proceedings of 2019 Fourteenth International Conference on Ecological Vehicles and Renewable Energies (EVER).* IEEE Press, 6 p. 8813678

Partial Charging Method for Lithium-Ion Battery State-of-Health Estimation
Schaltz, E., Stroe, D.-I., Nørregaard, K., Johnsen, B. & Christensen, A., May 2019, *Proceedings of 2019 Fourteenth International Conference on Ecological Vehicles and Renewable Energies (EVER) .* IEEE Press, 6 p. 8813645

Power Electronic Converters and Their Control in Thermoelectric Applications
Schaltz, E. & Man, E. A., 1 Jan 2017, *Thermoelectric Energy Conversion: Basic Concepts and Device Applications.* Wiley-IEEE press, p. 177-203 27 p.

Sensorless Model Predictive Direct Current Control Using Novel Second-Order PLL Observer for PMSM Drive Systems
Schaltz, E. & Preindl, M., 1 Sept 2011, In: I E E E Transactions on Industrial Electronics. 58, 9, p. 4087-4095 9 p.

Electrical Vehicle Design and Modeling
Schaltz, E., Aug 2011, *Electric Vehicles - Modelling and Simulations.* Soylu, S. (ed.). 1 ed. Croatia: INTECH, p. 1-24 24 p.

Vehicle Energy Consumption: A contribution to the Coherent Energy and Environmental System Analysis (CEESA) project
Schaltz, E., 18 Jan 2011, 76 p.

Design of a Fuel Cell Hybrid Electric Vehicle Drive System
Schaltz, E., Aug 2010, Department of Energy Technology, Aalborg University. 199 p.

Design and Control of a Multiple Input DC/DC Converter for Battery/Ultra-capacitor Based Electric Vehicle Power System
Schaltz, E., Li, Z., Onar, O. & Khaligh, A., 2009, *IEEE Applied Power Electronics Conference - APEC 2009.* IEEE (Institute of Electrical and Electronics Engineers), p. 591-596

Influence of Battery/Ultracapacitor Energy-Storage Sizing on Battery Lifetime in a Fuel Cell Hybrid Electric Vehicle
Schaltz, E., Rasmussen, P. O. & Khaligh, A., 2009, In: IEEE Transactions on Vehicular Technology. 58, 8, p. 3882 - 3891

Design and Comparison of Power Systems for a Fuel Cell Hybrid Electric Vehicle
Schaltz, E. & Rasmussen, P. O., 2008, *Proceedings of the IEEE Industry Applications Society Annual Meeting (IAS 2008).* IEEE (Institute of Electrical and Electronics Engineers), 8 p.

Investigation of Battery/Ultracapacitor Energy Storage Rating for a Fuel Cell Hybrid Electric Vehicle
Schaltz, E., Khaligh, A. & Rasmussen, P. O., 2008, *Proceedings of the IEEE Vehicle Power and Propulsion Conference (VPPC).* IEEE (Institute of Electrical and Electronics Engineers), p. 1-6

Non-Inverting Buck-Boost Converter for Fuel Cell Applications
Schaltz, E., Rasmussen, P. O. & Khaligh, A., 2008, *Proceedings of 34th Annual Conference on the IEEE Industrial Electronics Society (IECON 2008).* IEEE (Institute of Electrical and Electronics Engineers), p. 855-860 6 p.

Design of Propulsion System for a Fuel Cell Vehicle
Schaltz, E., Andreasen, S. J. & Rasmussen, P. O., 2007, *Proceedings of the 12th European Conference on Power Electronics and Applications, EPE 2007.* EPE Association

Development of a 400 W High Temperature PEM Fuel Cell Power Pack: Equivalent Circuit Modeling
Schaltz, E., Jespersen, J. L. & Rasmussen, P. O., 2006, *Fuel Cell Seminar.*

Sensorløs kontrol af motor
Schaltz, E., Matzen, T. N. & Bech, M. M., 2006, In: Elteknik : elektronik, automation og energi. 23, 7, p. 28-30 3 p.

Investigation of Pseudo-Active State in Z-Source Inverter
Schaltz, E., Oprea, O., Larsen, L. & Chen, Z., 2005, *International Conference on Power Electronics and Intelligent Control for Energy Conversation 2005 (PELINCEC'05),.* 6 p.