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LTH Profile Area: The Energy Transition  
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## Research

Mats Alaküla started his scientific career 1986 as a PhD student in control and design of electrical machines and drives. This evolved into not least automotive applications from hybrid to full electric vehicles and Mats became a full Professor in Industrial Electrical Engineering in 1994.  
His research render him a role as Scientific Advisor on Electromobility at AB Volvo, where he stayed for 14 years, after which moved on to Elonroad AB in a similar role and also as a research leader for 12 years in the Swedish Electromobility research centre.  
Today Mats research evolves around electromobility, not least in energy supply to a full electric vehicle fleet, both on road, off road in farming, road construction and mining. Mats has many advisory roles in different committees, investigations and he is an appreciated lecturer.

## Employment

### Professor

Division for Industrial Electrical Engineering and Automation  
Lund University  
Lund, Sweden  
1994 Sept 21 → present

### Profile area member

LTH Profile Area: The Energy Transition  
Lund University  
Sweden  
2022 Sept 5 → present

### Scientific advisor

Elonroad AB  
Lund, Sweden  
2021 Oct 1 → present

### Scientific Advisor

Volvo AB  
Sweden  
2007 Sept 1 → 2021 Sept 30

### Thematic area leader

Swedish Electromobility Centre  
Sweden  
2007 Jul 1 → 2019 Jun 30

## Research outputs

### **Performance Validation of a Bridgeless Interleaved Boost PFC Converter for Battery Charging Application**

Al-Hysam, A., Ali, Z., Alaküla, M. & Raisz, D., 2026 Apr 9, In: e-Prime – Nexus of Electrical, Electronic, and Intelligent Engineering. 17, 201181.

### **Techno-economic comparison and cost-effective design of robust charging infrastructures for large industrial sites**

Al-Hysam, A., Frank, B., Overmaat, R. & Alaküla, M., 2026 Apr 5, In: Energy Conversion and Management: X. 30, 101822.

### **Assessing energy use, cost, and emissions of small regional rail vehicles: methodology and case study on a German track**

Ahrling, C., Tunér, M., Gainey, B., Torkiharchegani, A., Scharmach, M., Hertel, B. & Alaküla, M., 2026 Apr, *WCX SAE World Congress Experience*. Society of Automotive Engineers, 2026-01-0419. (SAE Technical Papers).

### **Multi-Level PWM core loss tester employing switch-mode power amplifiers**

Colombo, L., Stahre, P., Reinap, A., Fyhr, P. & Alaküla, M., 2026, In: Journal of Magnetism and Magnetic Materials. 647, 174020.

### **Methods for the Investigation and Mitigation of Conducted Differential-Mode Electromagnetic Interference in Commercial Electrical Vehicles**

Widek, P. & Alaküla, M., 2025 Feb, In: Energies. 18, 4, 859.

### **Full electric farming with on-field energy replenishment**

Wallander, E., Frank, B., Alaküla, M. & Márquez-Fernández, F. J., 2025 Jan 1, In: Applied Energy. 377, 124416.

### **Aging-Aware Multi-Service Optimization of Heterogeneous Second-Life EV Battery Energy Storage Systems**

Li, H., Grimm, F. & Alakula, M., 2025, *Proceedings - 2025 7th International Conference on Electrical Engineering and Control Technologies, CEECT 2025*. Lie, T.-T., Yu, J. & Hou, H. (eds.). IEEE - Institute of Electrical and Electronics Engineers Inc., p. 475-480 6 p.

### **Enhancing Core Loss Tracking Accuracy in Stator Cores: A Comparative Assessment of Static and Dynamic Jiles-Atherton Model Formulations**

Colombo, L., Reinap, A., Fyhr, P. & Alaküla, M., 2025, In: IEEE Transactions on Magnetics. 6, 8, 7300512.

### **Enhancing Regional Rail Efficiency and Reducing Emissions with Dual Electric Traction Machine Drivetrain**

Torkiharchegani, A. & Alakula, M., 2025, (E-pub ahead of print) In: IEEE Transactions on Vehicular Technology.

### **Evaluating Electric Road Systems for Freight Transport in Sweden: A Simulation-Based Study on Trans-European Transport Network**

Arabani, H. P., Ingelström, M., Márquez-Fernández, F. J. & Alaküla, M., 2025, *2025 IEEE Kiel PowerTech, PowerTech 2025*. IEEE - Institute of Electrical and Electronics Engineers Inc., (2025 IEEE Kiel PowerTech, PowerTech 2025).

### **Placement of Fast-Charging Infrastructure for Long-Haul Road Freight Based on Spatio-Temporal Evaluation of En-Route Energy Needs**

Ingelstrom, M., Arabani, H. P., Alakula, M. & Marquez-Fernandez, F. J., 2025, (E-pub ahead of print) In: IEEE Transactions on Transportation Electrification.

### **The optimal capacity expansion planning for the terminals of the logistics company**

Li, H. & Alaküla, M., 2024 Nov, In: Applied Energy. 374, 124005.

### **Reducing the Environmental Impact of Large Battery Systems with Conductive Electric Road Systems—A Technical Overview**

Wenander, D. & Alaküla, M., 2024 Feb, In: World Electric Vehicle Journal. 15, 2, 59.

### **Efficiency evaluation of a conductive Electric Road System with respect to traffic characteristics**

Wenander, D., Marquez-Fernandez, F. J. & Alakula, M., 2024, In: IEEE Transactions on Vehicular Technology. 73, 4, p. 4694-4704 11 p.

### **Electric Road Systems for Electric Vehicle Long-Distance Travel: A Multi-Agent Simulation Approach**

Arabani, H. P., Ingelström, M., Márquez-Fernández, F. J. & Alakula, M., 2024, *2024 IEEE International Conference on Electrical Systems for Aircraft, Railway, Ship Propulsion and Road Vehicles and International Transportation Electrification Conference, ESARS-ITEC 2024*. IEEE - Institute of Electrical and Electronics Engineers Inc., (2024 IEEE International Conference on Electrical Systems for Aircraft, Railway, Ship Propulsion and Road Vehicles and International Transportation Electrification Conference, ESARS-ITEC 2024).

### **Measurements of the Electric Properties of the Current Collector in a Conductive Electric Road**

Wenander, D., Marquez-Fernandez, F. J. & Alakula, M., 2024, *15th International Conference Elektro 2024, ELEKTRO 2024 - Proceedings*. Hockicko, P. & Dubovan, J. (eds.). IEEE - Institute of Electrical and Electronics Engineers Inc.

### **A Forecasting Based Hierarchical Energy Management for Sustainable Data Centers**

Li, H., Alakula, M. & Gualous, H., 2023, *IECON Proceedings (Industrial Electronics Conference)*. IEEE Computer Society

### **An Economic Assessment of the Terminal Electrification for the Logistics Company**

Li, H. & Alakula, M., 2023, *PEDG 2023 - 2023 IEEE 14th International Symposium on Power Electronics for Distributed Generation Systems*. IEEE - Institute of Electrical and Electronics Engineers Inc., p. 716-721 6 p.

### **Common Mode Current Measurements in Traction Systems for Electric Vehicles**

Widek, P. & Alakula, M., 2023, In: *IEEE Transactions on Industry Applications*. 59, 2, p. 2061-2068 8 p.

### **Comparison of PMSM versus PMA-SynRM and IM from an Optimized Electric Vehicle Powertrain Perspective**

Lu, M., Domingues-Olavarria, G. & Alakula, M., 2023, *2023 26th International Conference on Electrical Machines and Systems, ICEMS 2023*. IEEE - Institute of Electrical and Electronics Engineers Inc., p. 4075-4080 6 p. (2023 26th International Conference on Electrical Machines and Systems, ICEMS 2023).

### **Electric off-road mobile machinery systems with portable energy supply and local energy generation**

Wallander, E., Frank, B., Alakula, M. & Márquez-Fernández, F. J., 2023, *2023 IEEE Belgrade PowerTech, PowerTech 2023*. IEEE - Institute of Electrical and Electronics Engineers Inc.

### **Electro-thermal Models of Power Modules for Stochastic Optimization of Inverters**

Byden, H., Bourniche, E., Domingues, G., Alakula, M., Leblay, A. & Marquez, F., 2023, *2023 IEEE Transportation Electrification Conference and Expo, ITEC 2023*. IEEE - Institute of Electrical and Electronics Engineers Inc.

### **Modelling Electric Transients in a Conductive Electric Road System**

Wenander, D., Marquez-Fernandez, F. J. & Alakula, M., 2023, *2023 115th AEIT International Annual Conference, AEIT 2023*. IEEE - Institute of Electrical and Electronics Engineers Inc.

### **Optimization of Induction Machine Design for Electric Vehicle Powertrain**

Lu, M., Domingues-Olavarria, G., Marquez-Fernandez, F. J., Byden, H. & Alakula, M., 2023, *2023 IEEE International Electric Machines and Drives Conference, IEMDC 2023*. IEEE - Institute of Electrical and Electronics Engineers Inc., (2023 IEEE International Electric Machines and Drives Conference, IEMDC 2023).

### **Optimization of Powertrain Platform for Electric Passenger Vehicles**

Lu, M., Domingues-Olavarria, G., Byden, H., Aleksandar, M. & Alakula, M., 2023, *2023 IEEE Transportation Electrification Conference and Expo, ITEC 2023*. IEEE - Institute of Electrical and Electronics Engineers Inc.

### **Parameter Identification For Inter Turn Fault Detection In Permanent-Magnet Synchronous Motors Using Stator Flux Linkage DC Offset Monitoring**

Upadhyay, A., Reinap, A. & Alakula, M., 2023, *Proceedings of the 2023 IEEE 14th International Symposium on Diagnostics for Electrical Machines, Power Electronics and Drives, SDEMPED 2023*. Zarri, L. & Lee, S. B. (eds.). IEEE - Institute of Electrical and Electronics Engineers Inc., p. 498-504 7 p.

### **Statistical Assessment of Core Loss Measurement Techniques for Laminated Steel**

Colombo, L., Soltanipour, S., Tokat, A., Reinap, A., Thiringer, T., Marquez Fernandez, F. J., Lindström, J. & Alaküla, M., 2023, *Statistical Assessment of Core Loss Measurement Techniques for Laminated Steel*. IEEE - Institute of Electrical and Electronics Engineers Inc., (IEEE Workshop on Electrical Machines Design, Control and Diagnosis (WEMDCD)); vol. 2023).

### **Dovetail Design for Direct Cooled Rotor: Design and Manufacturing**

Estenlund, S., Tokat, A., Engqvist, J. & Alaküla, M., 2022 Oct 13, *2022 International Conference on Electrical Machines (ICEM)*. IEEE - Institute of Electrical and Electronics Engineers Inc., p. 2121-2127 7 p.

### **Performance Degradation due to Cut Edge Effect for an Axial-Flux Induction Machine**

Colombo, L., Tokat, A., Bitsi, K., Marquez Fernandez, F. J. & Alaküla, M., 2022 Oct 13, *Proceedings - 2022 International Conference on Electrical Machines (ICEM)*. IEEE - Institute of Electrical and Electronics Engineers Inc., p. 1253-1259 7 p.

### **Conductive Electric Road Localization and Related Vehicle Power Control**

Karlsson, A. & Alaküla, M., 2022 Jan 17, In: *World Electric Vehicle Journal*. 13, 1, 17 p., 22.

### **Assessment of future EV charging infrastructure scenarios for long-distance transport in Sweden**

Marquez-Fernandez, F. J., Bischoff, J., Domingues-Olavarria, G. & Alakula, M., 2022, In: *IEEE Transactions on Transportation Electrification*. 8, 1, p. 615-626

### **A Theoretical Study Of Stator Flux Linkage DC Offset Based Stator Fault Detection For PMSM Drive Systems**

Upadhyay, A. & Alakula, M., 2022, *2022 IEEE Vehicle Power and Propulsion Conference, VPPC 2022 - Proceedings*. IEEE - Institute of Electrical and Electronics Engineers Inc.

### **Modelling of power flow and losses in a conductive Electric Road System**

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### **Energy supply to buses on a conductive electric road: An evaluation of charger topologies and electric road characteristics**

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### **Electric drivetrain optimization for a commercial fleet with different degrees of electrical machine commonality**

Lu, M., Domingues-olavarria, G., Márquez-fernández, F. J., Fyhr, P. & Alaküla, M., 2021 Jun 1, In: *Energies*. 14, 11, 2989.

### **Concept design of electric cruise and startability axles for long haul heavy vehicles to maximise driving range**

Janardhanan, S., Laine, L., Jonasson, M., Jacobson, B. & Alakula, M., 2021, *2021 IEEE Vehicle Power and Propulsion Conference, VPPC 2021 - ProceedingS*. IEEE - Institute of Electrical and Electronics Engineers Inc.

### **Measuring electric properties of a conductive electric road**

Wenander, D., Abrahamsson, P., Marquez-Fernandez, F. J. & Alakula, M., 2021, *2021 AEIT International Conference on Electrical and Electronic Technologies for Automotive, AEIT AUTOMOTIVE 2021*. IEEE - Institute of Electrical and Electronics Engineers Inc.

### **Automatic static charging of electric distribution vehicles using ERS technology**

Abrahamsson, P., Wenander, D., Alakula, M., Marquez-Fernandez, F. J. & Domingues-Olavarria, G., 2020, *2020 IEEE Transportation Electrification Conference and Expo, ITEC 2020*. IEEE - Institute of Electrical and Electronics Engineers Inc., p. 1191-1196 6 p. 9161573. (2020 IEEE Transportation Electrification Conference and Expo, ITEC 2020).

### **Integrated and isolated EV charger for AC and electric road applications**

Karlsson, A. & Alakula, M., 2020, *2020 International Symposium on Power Electronics, Electrical Drives, Automation and Motion, SPEEDAM 2020*. IEEE - Institute of Electrical and Electronics Engineers Inc., p. 114-119 6 p. 9161877. (2020 International Symposium on Power Electronics, Electrical Drives, Automation and Motion, SPEEDAM 2020).

#### **Modeling of electric power system in electric vehicles**

Widek, P. & Alakula, M., 2020, *2020 International Symposium on Power Electronics, Electrical Drives, Automation and Motion, SPEEDAM 2020*. IEEE - Institute of Electrical and Electronics Engineers Inc., p. 293-298 6 p. 9161884. (2020 International Symposium on Power Electronics, Electrical Drives, Automation and Motion, SPEEDAM 2020).

#### **Characterization of Onboard Condition Monitoring Techniques for Stator Insulation Systems in Electric Vehicles: A Review**

Upadhyay, A., Alakula, M. & Marquez-Fernandez, F. J., 2019 Dec 9, *IECON 2019: 45th Annual Conference of the IEEE Industrial Electronics Society*. IEEE Computer Society, p. 3179-3186 8 p. 8926678. (IECON Proceedings (Industrial Electronics Conference); vol. 2019).

#### **Thermal Modeling and Analysis of an Alternating Short-Segmented Conductive ERS**

Abrahamsson, P., Márquez-Fernández, F. J. & Alakula, M., 2019 Dec, In: *IEEE Transactions on Transportation Electrification*. 5, 4, p. 1078-1086 9 p., 8746810.

#### **Performance Estimation of a Traction Machine with Direct Cooled Hairpin Winding**

Reinap, A., Andersson, M., Márquez-Fernández, F. J., Abrahamsson, P. & Alakula, M., 2019 Jun 1, *ITEC 2019 - 2019 IEEE Transportation Electrification Conference and Expo*. IEEE - Institute of Electrical and Electronics Engineers Inc., 8790545

#### **Thermal Assessment of an ERS for Static Charging of Electric Vehicles**

Abrahamsson, P., Márquez-Fernández, F. J. & Alakula, M., 2019 Jun 1, *ITEC 2019 - 2019 IEEE Transportation Electrification Conference and Expo*. IEEE - Institute of Electrical and Electronics Engineers Inc., 8790521

#### **Using Multi-Agent Transport Simulations to Assess the Impact of EV Charging Infrastructure Deployment**

Márquez-Fernández, F. J., Bischoff, J., Domingues-Olavarria, G. & Alakula, M., 2019 Jun 1, *ITEC 2019 - 2019 IEEE Transportation Electrification Conference and Expo*. IEEE - Institute of Electrical and Electronics Engineers Inc., 8790518

#### **Alternative EV powertrain topologies designed for operation in a conductive electric road system**

Karlsson, A., Domingues-Olavarria, G. & Alakula, M., 2019 Jan 14, *2018 IEEE International Conference on Electrical Systems for Aircraft, Railway, Ship Propulsion and Road Vehicles and International Transportation Electrification Conference, ESARS-ITEC 2018*. IEEE - Institute of Electrical and Electronics Engineers Inc., 8607748

#### **Thermal modeling of an ERS during static charging**

Abrahamsson, P. & Alakula, M., 2019 Jan 14, *2018 IEEE International Conference on Electrical Systems for Aircraft, Railway, Ship Propulsion and Road Vehicles and International Transportation Electrification Conference, ESARS-ITEC 2018*. IEEE - Institute of Electrical and Electronics Engineers Inc., 8607497

#### **Optimization of Electric Powertrains Based on Scalable Cost and Performance Models**

Domingues-Olavarria, G., Marquez-Fernandez, F. J., Fyhr, P., Reinap, A., Andersson, M. & Alakula, M., 2019 Jan, In: *IEEE Transactions on Industry Applications*. 55, 1, p. 751-764 14 p.

#### **Electric safety challenges with a conductive electric road system-Chassis potential modeling and measurement**

Márquez-Fernández, F. J., Schuch, S., Lindgren, L. & Alakula, M., 2019, In: *World Electric Vehicle Journal*. 10, 2, 30.

#### **Thermal modeling of an ERS during dynamic charging**

Abrahamsson, P., Marquez-Fernandez, F. J. & Alakula, M., 2019, *2019 IEEE Vehicle Power and Propulsion Conference, VPPC 2019 - Proceedings*. IEEE - Institute of Electrical and Electronics Engineers Inc., 8952465

#### **Direct Conductor Cooling in Concentrated Windings**

Reinap, A., Marquez-Fernandez, F. J., Alakula, M., Deodhar, R. & Mishima, K., 2018 Oct 25, *Proceedings - 2018 23rd International Conference on Electrical Machines, IECM 2018*. IEEE - Institute of Electrical and Electronics Engineers Inc., p. 2654-2660 7 p. 8507094

### **Lumped-parameter grey-box modelling of traction machines for low-speed operation**

Hall, S. & Alakula, M., 2018 Oct 25, *Proceedings - 2018 23rd International Conference on Electrical Machines, ICEM 2018*. IEEE - Institute of Electrical and Electronics Engineers Inc., p. 2668-2674 7 p. 8506982

### **Power Losses and Heat Extraction in a Stator with Directly Air-Cooled Laminated Windings**

Reinap, A., Hogmark, C., Marquez-Fernandez, F. J., Alaküla, M. & Andersson, M., 2018 Oct 25, *Proceedings - 2018 23rd International Conference on Electrical Machines, ICEM 2018*. IEEE - Institute of Electrical and Electronics Engineers Inc., p. 2675-2681 7 p. 8506732

### **Electric roads: Analyzing the societal cost of electrifying all Danish road transport**

Domingues-Olavarria, G., Márquez-Fernández, F. J., Fyhr, P., Reinap, A. & Alaküla, M., 2018 Jun 7, In: *World Electric Vehicle Journal*. 9, 1, 9.

### **Assessment of cooling integration with direct cooled windings**

Reinap, A., Gabassi, M., Alakula, M. & Andersson, M., 2018, *2018 IEEE International Conference on Electrical Systems for Aircraft, Railway, Ship Propulsion and Road Vehicles and International Transportation Electrification Conference, ESARS-ITEC 2018*. IEEE - Institute of Electrical and Electronics Engineers Inc., 8607655

### **Dynamic Testing Characterization of a Synchronous Reluctance Machine**

Wiedemann, S., Hall, S., Kennel, R. & Alakula, M., 2018, In: *IEEE Transactions on Industry Applications*. 54, 2, p. 1370-1378

### **Electric safety challenges with a conductive Electric Road System - Chassis potential modeling and measurement -**

Márquez-Fernández, F. J., Schuch, S., Lindgren, L. & Alaküla, M., 2018.

### **EV powertrain topologies for electric road applications**

Karlsson, A., Domingues-Olavarria, G. & Alaküla, M., 2018.

### **Dynamic Magnetic Model Identification of Permanent Magnet Synchronous Machines**

Hall, S., Marquez-Fernandez, F. J. & Alakula, M., 2017 Dec 1, In: *IEEE Transactions on Energy Conversion*. 32, 4, p. 1367-1375 9 p., 7927753.

### **From Chip to Converter: A Complete Cost Model for Power Electronics Converters**

Domingues, G., Fyhr, P., Reinap, A., Andersson, M. & Alakula, M., 2017 Nov 1, In: *IEEE Transactions on Power Electronics*. 32, 11, p. 8681-8692 12 p., 7814334.

### **Dynamic charging solutions in Sweden: An overview**

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### **Electric roads: The importance of sharing the infrastructure among different vehicle types**

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### **Performance and manufacturability tradeoffs of different electrical machine designs**

Fyhr, P., Domingues, G., Reinap, A., Andersson, M. & Alakula, M., 2017 Aug 3, *2017 IEEE International Electric Machines and Drives Conference, IEMDC 2017*. IEEE - Institute of Electrical and Electronics Engineers Inc., 8002181

### **Electric roads: Reducing the societal cost of automotive electrification**

Fyhr, P., Domingues, G., Andersson, M., Márquez-Fernández, F. J., Bångtsson, H. & Alaküla, M., 2017 Jul 26, *2017 IEEE Transportation and Electrification Conference and Expo, ITEC 2017*. IEEE - Institute of Electrical and Electronics Engineers Inc., p. 773-778 6 p. 7993367

**Scalable performance, efficiency and thermal models for electric drive components used in powertrain simulation and optimization**

Domingues, G., Márquez-Fernández, F. J., Fyhr, P., Reinap, A., Andersson, M. & Alaküla, M., 2017 Jul 26, *2017 IEEE Transportation and Electrification Conference and Expo, ITEC 2017*. IEEE - Institute of Electrical and Electronics Engineers Inc., p. 644-649 6 p. 7993345

**PM-less machine topologies for EV traction: A literature review**

Estenlund, S., Alaküla, M. & Reinap, A., 2017 Feb 9, *2016 International Conference on Electrical Systems for Aircraft, Railway, Ship Propulsion and Road Vehicles & International Transportation Electrification Conference (ESARS-ITEC)*.

**Societal cost of electrifying all danish road transport**

Domingues-Olavarría, G., Márquez-Fernández, F. J., Fyhr, P., Reinap, A. & Alaküla, M., 2017 Jan 1, *EVS 2017 - 30th International Electric Vehicle Symposium and Exhibition 2017*. Landesmesse Stuttgart GmbH

**Thermal design of an electric road system**

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**Direct electromagnetic actuation on high ratio gears**

Reinap, A., Alakula, M. & Domingues, G., 2016 Nov 2, *Proceedings - 2016 22nd International Conference on Electrical Machines, ICEM 2016*. IEEE - Institute of Electrical and Electronics Engineers Inc., p. 743-749 7 p. 7732609

**A method for in-situ characterization of PMSM traction machines**

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**Dynamic Testing characterization of a synchronous reluctance machine**

Wiedemann, S., Kennel, R. M., Hall, S. & Alakula, M., 2016 May 20, *2016 11th International Conference on Ecological Vehicles and Renewable Energies, EVER 2016*. IEEE - Institute of Electrical and Electronics Engineers Inc., 7476426

**Degradation and Fatigue of Epoxy Impregnated Traction Motors Due to Thermal and Thermal Induced Mechanical Stress: Part I: Thermal Mechanical Simulation of Single Wire due to Evenly Distributed Temperature**

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**Degradation and fatigue of epoxy impregnated traction motors due to thermal and thermal induced mechanical stress - Part I: Thermal mechanical simulation of single wire due to evenly distributed temperature**

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**Dielectric Properties Modeling and Measurement of Single Tooth Coil Insulation System under Accelerated Degradation Test**

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**Engineering considerations on skewing of an interior permanent magnet synchronous machine for parallel hybrid electric heavy vehicles**

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### **Electrical Machine Design with Directly Cooled Laminated Fractional Pitch Windings**

Reinap, A., Högmark, C., Frogner, K., Lundström, F., Andersson, M., Alaküla, M. & Wang, L., 2015, [Host publication title missing].

### **Predictive monitoring of turn-on-turn insulation in single tooth coils**

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### **Heat transfer analysis of a traction machine with directly cooled laminated windings**

Reinap, A., Márquez-Fernández, F. J., Andersson, R., Högmark, C., Alaküla, M. & Göransson, A., 2014 Dec 12, 2014 4th International Electric Drives Production Conference, EDPC 2014 - Proceedings. IEEE - Institute of Electrical and Electronics Engineers Inc., 6984395

### **Cost estimation of electric traction machine and gearbox for a hybrid vehicle application**

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### **Consistency analysis of torque measurements performed on a PMSM using dynamic testing**

Hall, S., Loayza Vargas, Y., Reinap, A. & Alaküla, M., 2014, 2014 International Conference on Electrical Machines (ICEM). IEEE - Institute of Electrical and Electronics Engineers Inc., p. 1529-1535

### **Dynamic Testing Characterization of a HEV Traction Motor**

Marquez, F., Hall, S. & Alaküla, M., 2014, 2014 International Conference on Electrical Machines (ICEM). IEEE - Institute of Electrical and Electronics Engineers Inc., p. 1569-1575

### **Dynamic Thermal Modeling and Application of Electrical Machine in Hybrid Drives**

Huang, Z., Marquez, F., Loayza Vargas, Y., Reinap, A. & Alaküla, M., 2014, 2014 International Conference on Electrical Machines (ICEM). IEEE - Institute of Electrical and Electronics Engineers Inc., p. 2158-2164

### **FPGA implementation of a Deadbeat Direct Torque and Flux Control Scheme for Induction Machines**

Domingues, G., Marquez, F. & Alaküla, M., 2014, 2014 International Conference on Electrical Machines (ICEM). IEEE - Institute of Electrical and Electronics Engineers Inc., p. 776-782

### **Inductive Analysis of a Multiconductor System Prototype**

Abdallah, F. & Alaküla, M., 2014, 2014 International Symposium on Electromagnetic Compatibility (EMC Europe). IEEE - Institute of Electrical and Electronics Engineers Inc., p. 1170-1175

### **Inductive coupling matrix of a multiconductor system for a winding-on-core prototype**

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### **Performance Estimation of Hybrid Excited Machine with Alternating Pole Configuration**

Reinap, A., Alaküla, M., Hall, S. & Estenlund, S., 2014, 2014 International Conference on Electrical Machines (ICEM). IEEE - Institute of Electrical and Electronics Engineers Inc., p. 2638-2643

### **An Integrated 20-kW Motor Drive and Isolated Battery Charger for Plug-In Vehicles**

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### **Capacitively coupled transmission line model and validation of a winding-on-core prototype**

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### **Grid-Connected Integrated Battery Chargers in Vehicle Applications: Review and New Solution**

Haghbin, S., Lundmark, S., Alaküla, M. & Carlson, O., 2013, In: IEEE Transactions on Industrial Electronics. 60, 2, p. 459-473

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**Characterization and application of forced cooling channels for traction motors in HEVs**

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### **Control and Design Interaction in Hybrid Electric Vehicles - Benefits of Using Power Electronics**

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### **Efficiency of Off-Board, High Power, Electric Vehicle Battery Chargers with Active Power line Conditioning Capabilities**

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Lesage, P., Alaküla, M. & Gertmar, L., 1997, [*Host publication title missing*]. Vol. 2. p. 520-525

### **EHC-Electric Hybrid Vehicle Centre at LTH**

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## **Awards**

### **EV2X - Framtidens Energiresurs**

Alaküla, M. (PI)

Swedish Energy Agency: SEK1,614,265.00

2025/06/02 → 2026/12/31

## **Projects**

### **Charging Infrastructure for light and heavy vehicles in Sweden**

Alaküla, M. (Researcher)

2021/07/01 → 2024/06/30

### **CONVERGE - En lösning för energidistributionen inom vägbyggnation**

Alaküla, M. (PI)

Swedish Government Agency for Innovation Systems (Vinnova)

2023/03/06 → 2023/09/06

### **CONVERGE II - En lösning för energidistributionen inom vägbyggnation & bergtäkt**

Alaküla, M. (PI)

Swedish Energy Agency

2024/05/06 → 2027/12/17

### **KOSER: Cost-effective and robust charging infrastructure from a site perspective**

Al-Hysam, A. (Researcher), Alaküla, M. (Supervisor) & Frank, B. (Assistant supervisor)

2025/02/18 → 2028/02/18

**DANE: Direkt kylning Av aluminium liNdade Elmaskiner**

Alaküla, M. (PI)  
Swedish Energy Agency  
2024/01/01 → 2026/12/31

**Effektiva och robusta elmaskiner och reglersystem för integration i jetmotorer**

Alaküla, M. (PI)  
Swedish Government Agency for Innovation Systems (Vinnova)  
2024/06/11 → 2028/06/14

**Electrical Properties of Conductive Electric Roads**

Wenander, D. (Researcher), Alaküla, M. (Supervisor) & Marquez, F. (Assistant supervisor)  
2019/10/01 → 2025/05/16

**Electric Farm - Steg 2**

Alaküla, M. (Researcher)  
2019/10/01 → 2023/06/30

**EPOS: Electric Powertrain OptimiSation for Vehicles and Fleets**

Alaküla, M. (Researcher)  
2020/04/20 → 2023/05/03

**Elvägssystem för Materialhanteringsfordon - Konseptutstudie med Elonroad och Kalmar**

Alaküla, M. (PI)  
Swedish Energy Agency  
2023/12/01 → 2025/06/30

**EURail FP6 Future**

Ahrling, C. (Researcher), Tunér, M. (Researcher), Alaküla, M. (Researcher) & Torkiharchegani, A. (Researcher)  
2024/02/01 → 2026/11/30

**Evolution Road**

Alaküla, M. (Researcher), Wenander, D. (Research student) & Abrahamsson, P. (Researcher)  
2019/08/01 → 2024/12/31

**Framtidens depåladningskoncept - För en skalbar och snabb omställning av transportsektorn**

Alaküla, M. (PI)  
Swedish Government Agency for Innovation Systems (Vinnova)  
2022/04/01 → 2025/04/01

**SHORTS: Säkra, hållbara och resilienta transportsystem**

Alaküla, M. (PI)  
Swedish Energy Agency  
2024/04/01 → 2028/04/01

**TED: Terminalladdning av Elektriska Distributionsfordon**

Alaküla, M. (Researcher)  
2021/04/01 → 2023/06/30

**TEEM: Tillverknings effekter i elektriska maskiner**

Alaküla, M. (Researcher)  
2020/08/01 → 2024/03/31