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Qualifications

PhD in Engineering Sciences and Technology (F.R.I.A. Grant)
1 Oct 2012 → 20 Jan 2017
Master in Electrical Engineering (Energy), Université libre de Bruxelles
Sep 2010 → Jun 2012
Bachelor in Electromechanical Engineering, Université libre de Bruxelles
Sep 2007 → Jun 2010

Employment

Electromobility research centre

Vrije Universiteit Brussel
Brussels, Belgium
4 May 2020 → present

postdoctoral researcher

Electrical Engineering and Power Electronics
Vrije Universiteit Brussel
Brussels, Belgium
8 Apr 2019 → 31 Oct 2024

Project Engineer

GreenWatch
Belgium
17 Oct 2017 → 31 Dec 2018

Researcher

University of Nottingham
Nottingham, United Kingdom
1 Aug 2015 → 30 Sep 2015

Trainee

ESTEC
Netherlands
1 Aug 2011 → 28 Oct 2011

Researcher

Instituto Superior Técnico
Lissabon, Portugal
1 Oct 2010 → 20 Jan 2017

Research outputs

Modeling and Control of a Modular Multilevel Converter Based on a Battery Energy Storage System with Soft Arm State-of-Charge Balancing Control

Wang, Y., Chakraborty, S., Geury, T. & Hegazy, O., 4 Feb 2024, In: *Energies*. 17, 3, 24 p., 740.

Inductance and Power Losses Analysis of an Arm Inductor for a Modular Multilevel Converter

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Development of Smart Charging Scheduling and Power Management Strategy of a PV-ESS based Scalable EV Charging Station

Jaman, S., Verbrugge, B., Zhaksylyk, A., Geury, T., El Baghdadi, M. & Hegazy, O., 13 Dec 2023, In: *Transportation Research Procedia*. 72, 1, p. 1240-1247 8 p., TRPRO15962.

Assessing the Impact of EV Charging and Discharging Profiles on T-Type Active Front End Charger Lifetime

Polat, H., Hosseinabadi, F., Chakraborty, S., Geury, T., El Baghdadi, M. & Hegazy, O., 16 Nov 2023, *IECON 2023- 49th Annual Conference of the IEEE Industrial Electronics Society*. Singapore: IEEE, p. 1-7 7 p. (IECON Proceedings (Industrial Electronics Conference)).

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Modeling and Validation of Grid-to-Vehicle (G2V) and Vehicle-to-Grid (V2G) Operation with Combo CCS Type 2 Connector for Medium Duty Electric Vehicle Applications

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Simulation Analysis of the 5-Leg Inverter for a Fault-Tolerant Dual-Motor Drive System

Al Sakka, M., Geury, T., El Baghdadi, M., Dhaens, M., Al Sakka, M. & Hegazy, O., 2 Oct 2023, *European Conference on Power Electronics and Applications*. IEEE, 10 p. (2023 25th European Conference on Power Electronics and Applications, EPE 2023 ECCE Europe).

30 kW Three-Phase T-Type Active Front End 3D Electro-thermal Design

Polat, H., Egin Martin, G., Tran, M. T., Geury, T., El Baghdadi, M. & Hegazy, O., 4 Sep 2023, *2023 25th European Conference on Power Electronics and Applications (EPE'23 ECCE Europe)*. IEEE, 8 p. (2023 25th European Conference on Power Electronics and Applications, EPE 2023 ECCE Europe).

Performance Assessment of a Grid-Connected Two-Stage Bidirectional Converter for a Combined PV–Battery Energy Storage System

Hasan, M. M., Jaman, S., Geury, T. & Hegazy, O., 1 Jun 2023, In: *Energies*. 16, 11, p. 1-20 20 p., 4486.

A Review on Multilevel Converters for Efficient Integration of Battery Systems in Stationary Applications

Rauf, A. M., Geury, T. & Hegazy, O., May 2023, In: *Energies*. 16, 10, 38 p., 4133.

Co-design Optimization Framework for Grid Reinforcing Hybrid Battery Energy Storage System

Hasan, M. M., Geury, T. & Hegazy, O., 30 Mar 2023.

Review of Active Front-End Rectifiers in EV DC Charging Applications

Zhaksylyk, A., Rasool, H., Abramushkina, E., Chakraborty, S., Geury, T., El Baghdadi, M. & Hegazy, O., Mar 2023, In: *Open access journal Batteries- Special Issue on Advances in Charging Systems and Charging Management Strategies for Battery Electric Vehicles*. 9, 3, p. 1-35 36 p., 150.

Power Electronics and Battery Cooling Methods

Polat, H., Hosseinabadi, F., Hasan, M. M., Chakraborty, S., Geury, T., El Baghdadi, M., Wilkins, S. & Hegazy, O., 27 Feb 2023, *Batteries*.

A Review of DC Fast Chargers with BESS for Electric Vehicles: Topology, Battery, Reliability Oriented Control and Cooling Perspectives

Polat, H., Hosseinabadi, F., Hasan, M. M., Chakraborty, S., Geury, T., El Baghdadi, M., Wilkins, S. & Hegazy, O., 8 Feb 2023, In: Open access journal Batteries- Special Issue on Advances in Charging Systems and Charging Management Strategies for Battery Electric Vehicles. 9, 2, p. 1-36 36 p., 121.

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Hasan, M. M., Jaman, S., Geury, T. & Hegazy, O., 23 Dec 2022, *2022 Second International Conference on Sustainable Mobility Applications, Renewables and Technology (SMART)*. IEEE, p. 1-8 8 p. (2022 2nd International Conference on Sustainable Mobility Applications, Renewables and Technology, SMART 2022).

Reliability Assessment of SiC-Based Depot Charging Infrastructure with Smart and Bidirectional (V2X) Charging Strategies for Electric Buses

Verbrugge, B., Rasool, H., Hasan, M. M., Chakraborty, S., Geury, T., El Baghdadi, M. & Hegazy, O., 23 Dec 2022, In: Energies. 16, 1, p. 1-15 15 p., 153.

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Comparative Performance Assessment of Predictive Torque Control Strategy for Motor Drive Applications

Jaman, S., Zhaksylyk, A., Chakraborty, S., Tran, D-D., El Baghdadi, M., Geury, T. & Hegazy, O., 9 Dec 2022, *48th Annual Conference of the IEEE Industrial Electronics Society*. IEEE Xplore, p. 1-6 6 p. (IECON Proceedings (Industrial Electronics Conference); vol. 2022-October).

Effects of modularity on the performance and reliability of SiC MOSFET-based active front-end rectifiers in EV charging application

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Development and Validation of V2G Technology for Electric Vehicle Chargers Using Combo CCS Type 2 Connector Standards

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A Cloud-Connected In Situ Junction Temperature Measurement of a SiC Power MOSFET Module

Hasan, M. M., Chakraborty, S., Geury, T., El Baghdadi, M. & Hegazy, O., 6 Oct 2022. 1 p.

Real-Life Mission Profile Oriented Lifetime Estimation of a SiC Interleaved Bidirectional HV DC/DC Converter for Electric Vehicle Drivetrains

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Rasool, H., Tran, M. T., Chakraborty, S., Van Mierlo, J., Geury, T., El Baghdadi, M. & Hegazy, O., 9 Sep 2022, *24th European Conference on Power Electronics and Applications, EPE 2022 ECCE Europe*. Hanover, Germany: IEEE, p. P1-P9 9 p. (24th European Conference on Power Electronics and Applications, EPE 2022 ECCE Europe).

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A Multi-Objective Co-Design Optimization Framework for Grid-Connected Hybrid Battery Energy Storage Systems: Optimal Sizing and Selection of Technology

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Direct Predictive Power Control Strategy to Improve Charging and Power Quality of Autonomous Robotic Electric Vehicle Charging Systems

Rasool, H., Jaman, S., Chakraborty, S., Geury, T., El Baghdadi, M. & Hegazy, O., 24 Jun 2022, *2022 International Symposium on Power Electronics, Electrical Drives, Automation and Motion (SPEEDAM)*. Sorrento, Italy: IEEE, p. 574-580 7 p.

Impact of Smart Charging on the Reliability of Charging Infrastructure

Verbrugge, B., Rasool, H., Hasan, M. M., Chakraborty, S., Geury, T., El Baghdadi, M. & Hegazy, O., Jun 2022, *EVS35 Proceedings*. EVS35, p. 1-9 9 p.

Small Signal Average Switch Modeling and Dual Loop Control of Bidirectional Integrated Converter for G2V and V2G Application in Battery EVs

Jaman, S., El Baghdadi, M. (ed.), Chakraborty, S. (ed.), Geury, T. (ed.) & Hegazy, O. (ed.), 30 Mar 2022.

Two-layer control approach of a V2G capable off-board charger for electric buses

Verbrugge, B., Rasool, H., El Baghdadi, M., Geury, T. & Hegazy, O., 30 Mar 2022.

Design and Real-Time Implementation of a Control System for SiC Off-Board Chargers of Battery Electric Buses

Rasool, H., Verbrugge, B., Jaman, S., Abramushkina, E., Geury, T., El Baghdadi, M. & Hegazy, O., 16 Feb 2022, In: *Energies*. 15, 4, p. 1-19 19 p., 1434.

An Interoperable EMS for the Provision of Grid Services with Hybrid Energy Storage Systems

Unamuno, E., Polat, H., Cabezuelo, D., Galarza, J., Anta, A., Toutain, E., Geury, T. & Hegazy, O., 2022, *IECON 2022 – 48th Annual Conference of the IEEE Industrial Electronics Society*. IEEE, 7 p. (IECON Proceedings (Industrial Electronics Conference); vol. 2022-October).

Design and Optimization of the Arm Inductor for Modular Multilevel Converter

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Development of Smart Charging Scheduling and Power Management Strategy of a PV-ESS based Scalable EV Charging Station

Jaman, S., Verbrugge, B., Zhaksylyk, A., Geury, T., El Baghdadi, M. & Hegazy, O., 2022, *Transportation Research Procedia*. Elsevier, 8 p.

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Smart Integration of Electric Buses in Cities: A Technological Review

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Design and Implementation of a Multifunctional 6-phase Interleaved Bidirectional DC/DC Converter for Battery Electric Vehicle Applications

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Modelling and bi-level control design of a SiC off-board charging system for battery electric buses with V2G capability

Verbrugge, B., Rasool, H., El Baghdadi, M., Geury, T. & Hegazy, O., 25 Oct 2021, *EPE'21 Proceedings*. IEEE, 10 p. (2021 23rd European Conference on Power Electronics and Applications, EPE 2021 ECCE Europe).

Small Signal Average Switch Modeling and Dual Loop Control of Bidirectional Integrated Converter for G2V and V2G Applications in Battery EVs

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Reliability and Cost Assessment of Fault-Tolerant Inverter Topologies for Multi- Motor Drive Systems

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A Thorough Review of Cooling Concepts and Thermal Management Techniques for Automotive WBG Inverters: Topology, Technology and Integration Level

Abramushkina, E., Zhaksylyk, A., Geury, T., El Baghdadi, M. & Hegazy, O., 13 Aug 2021, In: Energies. 14, 16, p. 1-21 21 p., 4981.

The Application of Ant Colony Optimization: Book Chapter2: Application of Ant Colony Optimization for Co-Design of Hybrid Electric Vehicles

Vafaeipour, M., Tran, D-D., Geury, T., El Baghdadi, M. & Hegazy, O., 28 Jun 2021, Intech Open Access. 18 p.

Design and Technical Assessment of Local Electrical Storage Systems in Double-Fed Generators for Wind Turbine Power System Applications

Aksoz, A., Benômar, Y., Geury, T., El Baghdadi, M., Hegazy, O., Ozturk, S. B. & Colak, I., 24 Jun 2021, *2021 16th International Conference on Ecological Vehicles and Renewable Energies, EVER 2021*. p. 1-6 6 p. 9456665. (2021 16th International Conference on Ecological Vehicles and Renewable Energies, EVER 2021).

Comparative Analysis of Traction Inverter Controllers for the Mission-Profile Oriented Reliability and Performance Evaluation in Electric Vehicles

Zhaksylyk, A., Chakraborty, S., Abramushkina, E., Geury, T., El Baghdadi, M. & Hegazy, O., 23 Jun 2021, *2021 Sixteenth International Conference on Ecological Vehicles and Renewable Energies (EVER)*. IEEE, p. 1-5 5 p. 9456616. (2021 16th International Conference on Ecological Vehicles and Renewable Energies, EVER 2021).

Multiobjective GA Optimization for Energy Efficient Electric Vehicle Drivetrains

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Performance Enhancement of a Battery-Grid Connected SiC MMC for DC Microgrid Systems

Wang, Y., Aksoz, A., Geury, T., El Baghdadi, M. & Hegazy, O., 23 Jun 2021, *2021 Sixteenth International Conference on Ecological Vehicles and Renewable Energies (EVER)*. IEEE, p. 1-6 6 p. 9456612. (2021 16th International Conference on Ecological Vehicles and Renewable Energies, EVER 2021).

Virtual Sensing-Based Control Design of a SiC Off-Board Charging System for Electric Bus Applications

Rasool, H., Tran, M. T., Geury, T., El Baghdadi, M. & Hegazy, O., 23 Jun 2021, *Virtual Sensing-Based Control Design of a SiC Off-Board Charging System for Electric Bus Applications*. Monte-Carlo, Monaco: IEEE, p. 1-8 8 p. 9456641. (2021 16th International Conference on Ecological Vehicles and Renewable Energies, EVER 2021).

Design Optimization and Electro-thermal Modelling of an Off-Board Charging System for Electric Bus Applications

Rasool, H., Verbrugge, B., Zhaksylyk, A., Tran, M. T., El Baghdadi, M., Geury, T. & Hegazy, O., 4 Jun 2021, In: IEEE Access . 9, p. 84501-84519 19 p., 9446870.

Emissions and Total Cost of Ownership Assessment of Hybrid Propulsion Concepts for Bus Transport with CNG or Diesel Engine

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Indirect Matrix Converter-Based Grid-Tied Photovoltaics System for Smart Grids

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Optimal Design of Hybrid PV-Battery System in Residential Buildings: End-User Economics, and PV Penetration
Worigi, I., Geury, T., Hegazy, O., El Baghdadi, M., Van Mierlo, J. & Maach, A., 1 Mar 2019, In: *Applied Sciences*. 9, 5, p. 1022-1032 11 p., 1022.

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Testing the Enhanced Functionalities of Commercial PV Inverters Under Realistic Atmospheric and Abnormal Grid Conditions
Lopez Erauskin, R., Geury, T., Gonzalez Fernandez De Bobadilla, A., Gyselinck, J., Hervas, M. E. & Fabre, A., 19 Oct 2015, *Testing the Enhanced Functionalities of Commercial PV Inverters Under Realistic Atmospheric and Abnormal Grid Conditions*. 5th Solar Integration Workshop, p. 1-7 7 p.

Current source inverter-based photovoltaic system with enhanced active filtering functionalities
Geury, T., Pinto, S. & Gyselinck, J., 2015, In: *Journal of Power Electronics*. 8, 12, p. 2483-2491

Three-phase power controlled PV current source inverter with incorporated active power filtering
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Emulation of Photovoltaic arrays with shading effect for testing of grid-connected inverters
Geury, T. & Gyselinck, J., Sep 2013, *2013 15th European Conference on Power Electronics and Applications (EPE)*. IEEE, p. 1-9 9 p.

Projects

EUAR27: Electric Vehicle Charging Infrastructure for improved User Experience
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1/05/20 → 30/04/24

EU581: ACHILES: Advanced Architectures Chassis/Traction concept for Future Electric vehicles
Hegazy, O., El Baghdadi, M., Van Mierlo, J., Geury, T., Firouz, Y., Heidari Gandoman, F., Rauf, A. M., Youssef, R., Berecibar, M. & De Sutter, L.
European Commission
1/12/18 → 30/11/22

EUAR176: BATSS : SAFE EFFICIENT BATTERY SYSTEM BASED ON ADVANCED CELL TECHNOLOGY
Hegazy, O., Chakraborty, S., Varga, E. F., Verbrugge, B. & Geury, T.
1/01/24 → 31/12/26

BRGCON15: Connect 2020: iSTORMY : Interoperable, modular and smart hybrid energy storage system for stationary applications
Hegazy, O. & Geury, T.
21/01/20 → 20/04/20

BRGCON27: Connect 2022: PEM4CS: Next generation SiC-based Power Electronics Modules (half-bridges)

Hegazy, O., Geury, T. & Varga, E. F.

6/11/21 → 5/01/22

EUAR110: EBRT2030 : European Bus Rapid Transit of 2030: electrified, automated, connected.

Hegazy, O., Geury, T., Chakraborty, S., Hasan, M. M. & Varga, E. F.

1/01/23 → 31/12/26

EUAR147: EcoMobility : Intelligent, Safe and secure connected Electrical Mobility solutions: Towards European Green Deal and Seamless Mobility

Hegazy, O., Geury, T. & Verbrugge, B.

1/05/23 → 30/04/26

BRGRD45: Experimental Platforms 2020 Preparations: Smart Charging Point

Hegazy, O. & Geury, T.

1/03/20 → 15/09/20

EUAR67: Horizon 2020: Highly EFFICIENT and reliable electric drivetrains based on modular, intelligent and highly integrated wide band gap power electronics modules

Hegazy, O., El Baghdadi, M., Geury, T., Chakraborty, S., Tran, D., Rasool, H. & Polat, H.

1/05/21 → 31/10/24

EUAR41: H2020: Interoperable, modular and Smart hybrid energy STORage systeM for stationarY applications

Hegazy, O., Geury, T., El Baghdadi, M., Chakraborty, S., Polat, H. & Hasan, M. M.

1/12/20 → 31/05/24

VLAFLX6: ICON: AUTONOMOUS ROBOTIC AND EFFICIENT ELECTRIC VEHICLE CHARGING SYSTEMS FOR SMART BUILDINGS AND PARKING LOTS (BELLA)

Hegazy, O., Geury, T., El Baghdadi, M., Chakraborty, S., Verbrugge, B. & Vanderborght, B.

1/01/22 → 30/08/23

IOFPOC47: IOF Proof of Concept: Redirect - Smart and Efficient Driving Circuits for LED lighting Systems and DC Networks in Various Applications

Jacobs, V. A., Hegazy, O., Geury, T., Tran, M. T. & El Baghdadi, M.

15/07/21 → 14/07/23

BRGRD65: Joint R&D 2022: Smart Charging Point.

Hegazy, O., Geury, T. & Delaere, S.

1/12/21 → 28/02/22

BRGPROV19: Key Digital Solutions: Intelligent, Safe and Secure connected Electrical Mobility solutions: Towards European Green Deal and Seamless Mobility

Hegazy, O., Van Mierlo, J., Geury, T., Verbrugge, B., Varga, E. F., Chakraborty, S. & Hruz, A.

1/03/23 → 28/02/26

EUAR111: NEMOSHIP : New modular Electrical architecture and digital platforM to Optimise large battery systems on SHIPs

Hegazy, O., Geury, T., Tran, D., Abramushkina, E. & Jaman, S.

1/01/23 → 31/12/26

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