

Giuseppe Graber

Curriculum Vitae, Teaching and Research Activities

Personal information



Place of Birth: *Salerno (SA) - Italy*

Date of Birth: *05/12/1983*

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Education and Training

In 2016, he obtained the **PhD in Information Engineering** (XIV Cycle - New Series) from the University of Salerno, discussing a thesis entitled "Electric Mobility: Smart Transportation in Smart Cities".

In 2013, he obtained the **qualification to practice as engineer** from the University of Salerno. Since 2017, he has been registered with the Order of Engineers in Salerno - Section A.

In 2011, he obtained the **master's degree** in electronic engineering from the University of Salerno, discussing a thesis entitled "Sizing and control strategies of the powertrain of an electric vehicle".

Academic Experience

From 01/02/2024 to now, he is **researcher (RTDb)** on Power Systems at the Department of Industrial Engineering of the University of Salerno.

From 10/2017 to 12/2017, he was holder of **research contract** for a project entitled "Support to the engineering and testing phases of an electric vehicle prototype" - Department of Industrial Engineering - University of Salerno.

From 08/2015 to 12/2017, he was the holder of **research grant** for a project entitled: "Modelling and characterization of distributed generation systems from renewable sources" - Department of Industrial Engineering - University of Salerno.

From 04/2014 to 03/2015, he was the holder of **research grant** for a project entitled: "Modelling and implementation of software simulators for evaluating the impact on distribution networks in urban areas caused by electric vehicles" - Department of Industrial Engineering - University of Salerno.

From 09/2012 to 08/2013, he was the holder of **research contract** for a project entitled "Support to the engineering of on-board subsystems with supercapacitors in light railway vehicles aimed at energy recovery" - Department of Industrial Engineering - University of Salerno.

Company Experience

From 01/2018 to 30/01/2024, he held the position of **R&D engineer** at Hitachi Rail STS SpA, a Japanese multinational company dealing with the design, construction and operation of railway vehicles and infrastructure.

MAIN ACTIVITIES

- Development of research activities in the railway and tramway sector with a focus on both technological and modelling aspects related to the traction and auxiliary chain, energy consumption and driving safety.
- Support for the presentation and technical-administrative management of national and international funded research projects involving other companies and research organisations.
- Support for corporate intellectual property management activities such as drafting new patents, prior art searches and freedom-to-operate checks.

Research Projects

He has participated in the activities of numerous national and international research projects. In particular:

- 2011-2015. PON01_00595 SFERE - Sistemi Ferroviari Ecosostenibilita e Risparmio Energetico.
- 2012-2014. POLIGRID - Smart Grid con Sistemi di Poligenerazione Distribuita.
- 2013-2017. PON03PE_00177_1 FERGE - Dispositivi, tecniche e tecnologie abilitanti per le Fonti Energetiche Rinnovabili verso la Green Economy.
- 2013-2017. PON03PE_00175_1 METER - Metrologia per l'Energia e le Reti.
- 2017-2023. REINForce - Research to Inspire the Future. Nell'ambito dell'accordo di sviluppo 00609 - Ministero dello Sviluppo Economico.
- 2017-2021. Progetto europeo MYRAILS - Metrology for Smart Energy Management in Electric Railway Systems. Nell'ambito dell'European Metrology Programme for Innovation and Research (EMPIR) of the European Association of National Metrology Institutes (EURAMET).
- 2022-2026. Progetto europeo FP4 - Rail4Earth. Nell'ambito dell'Europe's Rail EU Joint Undertaking 2022-2031.

Editorial Activity

He has served as **Guest Editor** for MDPI Journals:

- *Electronics* (Impact Factor 2.690 - citescore 3.7),
- *Energies* (Impact Factor 3.2 - citescore 5.5)

He serves as **reviewer** for numerous international scientific journals including IEEE Transactions on Smart Grids, IEEE Transactions on Power Systems, IEEE Transactions on Transportation Electrification, ScienceDirect Applied Energy, ScienceDirect International Journal of Electrical Power & Energy Systems (IJEPES).

Honors & Awards

Best Paper Award for the paper *Sizing of II-life Batteries for Grid Support: application and economic evaluations* presented in Creta at the VIII International Conference on Smart Cities and Green ICT Systems (SMARTGREENS) - May 2019.

Outstanding Spirit Award at the context *Make a Difference!* This is a competition open to Hitachi employees around the world, calling for new business ideas to contribute to the well-being of society and people, as well as work improvement ideas as a basis for the growth of the Hitachi Group.

In the 2022/2023 edition, the Outstanding Spirit Award was assigned to the HORA team composed by L. Fratelli, **G. Graber**, F. Fasano, W. Ausiello, G. D'andria (Hitachi Rail STS SpA) e M. Lenardi, A. E. Ohazulike, Q. Nguyen, O. Takehito, D. Di Paola (Hitachi Europe Corporate Research Centre).

Support for Teaching and Thesis Activities

From 2014 to 2017, he supported classroom and laboratory exercises for the course "Power Converters for Energy and Transportation" (S.S.D. ING-IND33) - master's degree Course in Electronic Engineering at the University of Salerno studies.

From 2014 to 2017, he supported the classroom and laboratory exercises for the course "Electrical machines and installations" (S.S.D. ING-IND33) - bachelor's degree course in Electronic Engineering at the University of Salerno.

He was nominated for the academic year 2014/2015, expert in the subject with inclusion in the examination commission of the courses "Power Electronics for Energy Conversion" (S.S.D. ING-IND33) - master's degree Course in Electronic Engineering at the University of Salerno and "Electrical Machines and Systems" (S.S.D. ING-IND33) - bachelor's degree course in Electronic Engineering at the University of Salerno

He was nominated for the two-year period 2020/21 and 2021/22, expert in the subject with inclusion in the examination commission of the course "Electronic Converters for Energy and Transport" (S.S.D. ING-IND33) - master's degree Course in Electronic Engineering at the University of Salerno.

He was nominated for the two-year periods 2022/23 and 2023/24, subject expert with inclusion in the examination commission of the following courses: "Electronic Converters for Energy and Transport" (S.S.D. ING-IND33) and "Smart Energy Management & Technologies for Sustainability" (S.S.D. ING-IND33) - master's degree Course in Electronic Engineering at the University of Salerno.

From 2014 to now, he has supported master's degree students in Electronic Engineering and Electrical Engineering in experimental activities on issues relating to the sizing of the powertrain of electric vehicles, the energy management of energy storage systems and the impact of electric vehicles on smart cars.

Other Teaching Activities

National Inter-university Consortium for Energy and Electrical Systems (EnSiEL) - Training project PON01_02582/F2. Teaching module: A.3.4.1 *Storage systems* (15 hours), location: University of Calabria (03/2014).

Inter-university Consortium for Research on Metrics and Measurement Technologies on Electrical Systems (Me.S.E.) - Training project PON03PE_00175_1/F. Teaching module: Power Flow optimization (28 hours), location: University of Salerno (10/2015).

Inter-university Consortium for Research on Metrics and Measurement Technologies on Electrical Systems (Me.S.E.) - Training project PON03PE_00177_1/F2. Teaching module: Update on the legislative and regulatory framework relating to incentives for renewable energy sources (12 hours), location: University of Salerno (12/2016).

TrainWork Consortium – Training project AGORA AVT/145/18II: Teaching module: Diagnosis techniques for electronic and electrotechnical systems (60 hours), location: Jabil Circuit Italia Srl (04/2021)

S.T.A.M.P.A. Srl - Training Project HOPE AVT/044/20: Teaching module: The Rational Use of Energy Resources in Production Processes (16 hours), location: IGAT SpA (01/2022).

Patents

He is co-inventor of the following patents:

- IT202100007961A1 - *Procedimento e Sistema di Controllo per Generare un Profilo di Guida Ottimale per Veicoli Provvisi di Propulsione Elettrica*. Publication date: 01-10-2022.
- EP4067200A2 - *Railway vehicle provided with lidar devices*. Publication date: 10-05-2022.
- IT202000004342A1 - *Veicolo su rotaia provvisto di un pantografo e di un sistema di comando per sollevare/abbassare tale pantografo*. Publication date: 02-09-2021.
- IT202000002566A1 - *Veicolo A Trazione Elettrica Includente Un Sistema Di Gestione Di Energia, E Metodo Di Gestione Di Energia In Tale Veicolo A Trazione Elettrica*. Publication date: 10-08-2021.

Speaker at Conferences

Since 2013, he has continuously participated as a speaker at international and national scientific conferences. In particular:

- PQ 2014 - IEEE Electric Power Quality and Supply Reliability Conference, Rakvere (Estonia), June 11-13, 2014.
- SPEDAAM 2014 - 22nd IEEE International Symposium on Power Electronics, Electrical Drives, Automation and Motion, Ischia (Italy), June 18-20, 2014.
- ESARS 2015 - 3rd IEEE International Conference on Electrical Systems for Aircraft, Railway, Ship Propulsion and Road Vehicles, Aachen (Germany), March 3-5, 2015.
- ICIT 2015 - IEEE International Conference on Industrial Technologies, Seville (Spain), March 17-19, 2015.
- ICRERA 2015 - 4th IEEE International Conference on Renewable Energy Research and Applications, Palermo, (Italy), November 22-25, 2013.
- ESARS ITEC 2016 - 4th IEEE International Conference on Electrical Systems for Aircraft, Railway, Ship Propulsion and Road Vehicles & International Transportation Electrification Conference, Toulouse (France), November 2-4, 2016.
- EEEIC 2016 - 16th IEEE International Conference on Environment and Electrical Engineering, Florence (Italy), June 07-10, 2016.
- IEEE PES GM 2017 - IEEE Power and Energy Society General Meeting, Chicago, IL USA, July 16-20, 2017.
- SMARTGREENS 2018 - 7th International Conference on Smart Cities and Green ICT Systems, Funchal, Madeira (Portugal), March 16-18, 2018.
- SMARTGREENS 2019 - 8th International Conference on Smart Cities and Green ICT Systems, Heraklion, Crete (Greece), May 3-5, 2019.

- ICPEES 2019 - 9th International Conference on Power and Energy Systems, Perth, WA (Australia), December 10-12, 2019.
- MELECON 2022 - 21st IEEE Mediterranean Electrotechnical Conference, Palermo (Italy), June 14-16, 2022.

Research Activities

Over the years, Giuseppe Graber's scientific publications have approached different research topics within the disciplinary macro-sector 09/E2 - Electrical Engineering - and especially of Power Systems (ING-IND/33). In particular:

- Impact of renewable sources and electric vehicles on distribution networks
- Energy storage systems in railway transport systems
- Powertrain of electric vehicles equipped with hybrid energy storage systems
- Advanced driving assistance systems and eco-drive

Publications

JOURNAL PAPERS

- [1] A. R. Finamore, V. Calderaro, V. Galdi, **G. Graber**, L. Ippolito, G. Conio - "Improving Wind Power Generation Forecasts: A Hybrid ANN-Clustering-PSO Approach," in *Energies*, 16(22), 7522, November 2023.
- [2] **G. Graber**, V. Calderaro, V. Galdi - "Two Stage Optimization Method for Sizing Stack and Battery Modules of a Fuel Cell Vehicle Taking into Account the Power Split Control," in *Electronics*, 11, no. 3, 361, Jan. 2022.
- [3] **G. Graber**, V. Calderaro, V. Galdi, L. Ippolito and G. Massa - "Impact Assessment of Energy Storage Systems Supporting DC Railways on AC Power Grids," in *IEEE Access*, vol. 10, pp. 10783-10798, Jan. 2022.
- [4] **G. Graber**, V. Calderaro, V. Galdi, A. Piccolo - "Battery Second Life for Dedicated and Shared Energy Storage Systems Supporting EV Charging Stations," in *Electronics*, 9, no. 6, 939, June 2020.
- [5] **G. Graber**, V. Calderaro, P. Mancarella, V. Galdi - "Two-stage stochastic sizing and packetized energy scheduling of BEV charging stations with quality-of-service constraints," in *Applied Energy*, vol. 260, Feb. 2020, 114262.
- [6] **G. Graber**, V. Calderaro, V. Galdi, A. Piccolo, R. Lamedica, A. Ruvio - "Techno-economic Sizing of Auxiliary-Battery-Based Substations in DC Railway Systems," in *IEEE Transactions on Transportation Electrification*, vol. 4, no. 2, pp. 616-625, June 2018.
- [7] V. Calderaro, V. Galdi, **G. Graber**, A. Piccolo - "Generation Rescheduling and Load Shedding in Distribution Systems under Imprecise Information," in *IEEE Systems Journal*, vol. 12, no.1, pp. 383-391, March 2018.
- [8] V. Calderaro, V. Galdi, **G. Graber**, A. Piccolo - "Optimal Generation Rescheduling in Microgrids under Uncertainty," in *International Review of Electrical Engineering* - vol. 8, no. 5, Oct. 2013.

CONFERENCE PAPERS

- [9] F. Del Pizzo, C. Quanciari, G.M. Giannuzzi, C. Vergine, C. Pisani, A. Coretti, T. D'Aversa, A.R. Cassano, V. Galdi, V. Calderaro, L. Ippolito, **G. Graber** - "Voltage Regulation in Transmission Systems the Experience of TERN," in *proc. of PES GT&D International Conference & Exposition*, IEEE 2023.
- [10] I. Boldea, F. Marignetti, **G. Graber**, M. Porzio, L. Fratelli - "PM-free electric motor powertrains in road and rail transport: an overview," in *proc. of International Conference on Electrical Systems for Aircraft, Railway, Ship Propulsion and Road Vehicles & International Transportation Electrification Conference (ESARS-ITEC)*, IEEE 2023, pp. 1-9.
- [11] **G. Graber**, V. Calderaro, V. Galdi, L. Ippolito - "Energy Storage Systems in DC Railways for Improving Operating Conditions of AC Power Grids," in *proc. of Mediterranean Electrotechnical Conference (MELECON)*, IEEE 2022, pp. 40-45.
- [12] P. Stella, V. Galdi, V. Calderaro, L. Fratelli, **G. Graber**, A. Piccolo - "A Real-Time Method for Eco-Driving Pattern Generation in Urban Railway System," in *proc. of World Congress on Railway Research (WCRR)*, 2022, pp. 1-6.

- [13] **G. Graber**, V. Calderaro, V. Galdi, A. Piccolo - "Sizing of II-life batteries for grid support applications and economic evaluations," *in proc. of International Conference on Smart Cities and Green ICT Systems (SMARTGREENS)*, 2019, pp.80-88.
- [14] **G. Graber**, V. Galdi, V. Calderaro, F. Lamberti, A. Piccolo - "Centralized Scheduling Approach to Manage Smart Charging of Electric Vehicles in Smart Cities," *in proc. of International Conference on Smart Cities and Green ICT Systems (SMARTGREENS)*, 2018, pp. 238-245.
- [15] **G. Graber**, V. Galdi, V. Calderaro and A. Piccolo - "A method to size the stack and the battery of a fuel cell vehicle reducing the fuel consumption," *in proc. of AEIT International Annual Conference*, IEEE 2017, pp. 1-6.
- [16] **G. Graber**, F. Lamberti, V. Calderaro, V. Galdi and A. Piccolo - "Stochastic characterization of V2G parking areas for the provision of ancillary services," *in proc. of Innovative Smart Grid Technologies Conference Europe (ISGT-Europe)*, IEEE 2017, pp. 1-6.
- [17] **G. Graber**, V. Galdi, V. Calderaro, A. Piccolo - "A Flexible Prototype for Testing Advanced Energy Management Solutions in Full Electric Vehicles", *in proc. of Vehicle Power and Propulsion Conference (VPPC)*, IEEE 2017, pp. 1-4.
- [18] V. Calderaro, V. Galdi, **G. Graber**, F. Lamberti, A. Piccolo - "A Sizing Method for Economic Assessment of II-Life Batteries for Power System Applications", *in proc. of Power and Energy Society General Meeting*, IEEE 2017, pp.1-5.
- [19] **G. Graber**, V. Galdi, V. Calderaro, P. Mancarella - "A Stochastic Approach to Size EV Charging Stations with Support of Second Life Battery Storage Systems", *in proc. of IEEE Power and Energy Society PowerTech Conference*, IEEE 2017, pp.1-6.
- [20] **G. Graber**, V. Galdi, V. Calderaro, A. Piccolo - "A Power Split Control Algorithm for Fuel Cell Electric Vehicles using Batteries or Supercapacitors as Auxiliary Storage System", *in proc. of International Conference on Clean Electrical Power (ICCEP)*, IEEE 2017, pp. 1-6.
- [21] **G. Graber**, V. Galdi, V. Calderaro, A. Piccolo, L. Fratelli - "Experimental Validation of a Steady-State Metro Network Simulator for Eco-Drive Operations", *in proc. of International Conference on Environment and Electrical Engineering (EEEIC)*, IEEE 2016, pp. 1-6.
- [22] **G. Graber**, V. Galdi, V. Calderaro, A. Piccolo - "Sizing and Energy Management of On-Board Hybrid Energy Storage Systems in Urban Railway Systems", *in proc. of International Conference on Electrical Systems for Aircraft, Railway, Ship Propulsion and Road Vehicles & International Transportation Electrification Conference (ESARS-ITEC)*, IEEE 2016, pp. 1-6.
- [23] V. Calderaro, V. Galdi, **G. Graber**, A. Piccolo - "Deterministic vs Heuristic Algorithms for Eco-Driving Application in Metro Network", *in proc. of International Conference on Electrical Systems for Aircraft, Railway, Ship Propulsion and Road Vehicles (ESARS)*, IEEE 2015, pp. 1-6.
- [24] V. Calderaro, V. Galdi, **G. Graber**, A. Piccolo - "Optimal Siting and Sizing of Stationary Supercapacitors in a Metro Network using PSO", *in proc. of International Conference on Industrial Technologies (ICIT)*, IEEE 2015, pp. 26801-2685.
- [25] R. Lamedica, A. Ruvio, V. Galdi, **G. Graber**, P. Sforza, G. G. Buffarini, C. Spalvieri - "Application of Battery Auxiliary Substations in 3kV Railway Systems", *in proc. of AEIT International Annual Conference*, IEEE 2015, pp. 1-6.
- [26] V. Calderaro, V. Galdi, **G. Graber**, A. Capasso, R. Lamedica, A. Ruvio - "Energy Management of Auxiliary Battery Substation Supporting High-Speed Train on 3 kV DC Systems", *in proc. of International Conference on Renewable Energy Research and Applications (ICRERA)*, IEEE 2015, pp. 1224-1229.
- [27] **G. Graber**, G. Massa, V. Galdi, V. Calderaro, A. Piccolo - "Performance Comparison between Scheduling Strategies for PEVs Charging in Smart Grids", *in proc. of International Conference on Renewable Energy Research and Applications (ICRERA)*, IEEE 2015, pp. 1213-1218.
- [28] V. Calderaro, V. Galdi, **G. Graber**, G. Graditi, F. Lamberti - "Impact assessment of energy storage and electric vehicles on smart grids", *in proc. of Electric Power Quality and Supply Reliability Conference (PQ)*, IEEE 2014, pp. 15-18.

- [29] V. Calderaro, D. Cogliano, V. Galdi, **G. Graber**, A. Piccolo - "An Algorithm to Optimize Speed Profiles of the Metro Vehicles for Minimizing Energy Consumption", *in proc. of International Symposium on Power Electronics, Electrical Drives, Automation and Motion (SPEEDAM)*, IEEE 2014, pp. 813-819.
- [30] V. Calderaro, V. Galdi, **G. Graber**, G. Massa, A. Piccolo - "Plug-in EV Charging Impact on Grid Based on Vehicles Usage Data", *in proc. of International Electric Vehicle Conference (IEVC)*, IEEE 2014, pp. 1-7.
- [31] V. Calderaro, V. Galdi, **G. Graber**, A. Piccolo - "Siting and Sizing of Stationary Supercapacitors in a Metro Network", *in proc. of AEIT Annual Conference*, IEEE 2013, pp.1-5.

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Fisciano, 26/01/2024

Giuseppe Graber