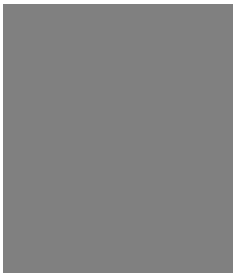
Nicola Blasuttigh

Curriculum Vitae

nicola.blasuttigh@units.it
nicola-blasuttigh
Birthday: 26 July 1991



Short-Bio and Brief Summary

He completed his Electrical Engineering degree with honors at the University of Trieste and obtained the title of Ph.D. in Industrial and Information Engineering with the thesis "Energy management systems and optimization strategies for EV integration, taking into account economic and environmental factors". He has actively participated in different projects with both private bodies and funded by competitive tenders. His research interests encompass areas such as photovoltaic and battery energy storage systems, energy management systems and power electronic converters together with 3E (energy, economic and environmental) evaluation of energy systems and renewable energy communities. Currently, he holds the position of Postdoctoral Research Fellow at the University of Trieste. Also, he serves as Associate Editor in IEEE Journal of Photovoltaics.

- Bibliometric indicators (updated to 10/06/2024): Publications: 16 | h-index: 5 | Citations: 80 (source: Scopus)
- On 22 February 2023, he received his PhD in Industrial and Information Engineering, under the supervision of Prof. Thomas Parisini and Prof. Alessandro Massi Pavan at the University of Trieste, Trieste, Italy.
- Since 1 December 2022, he is a Research Fellow supervised by Prof. Alessandro Massi Pavan, with the Dept. of Engineering and Architecture, University of Trieste, Trieste, Italy.
- He obtained the qualification to practice the profession of Industrial Engineer Section A in July 2020.
- Since a.y. 2023/2024, he has been appointed "Cultore della Materia" with the Department of Engineering and Architecture, University of Trieste, Trieste, Italy.
- Since a.y. 2020/2021, he has been a Teaching Assistant for B.Sc. engineering courses with the Dept. of Engineering and Architecture, University of Trieste, Trieste, Italy.

Degrees and Education

Nov. 2019 - Mar. 2023 **Ph.D. in Industrial and Information Engineering**
University of Trieste
Ciclo: XXXV
Dissertation title: Energy management systems and optimization strategies for EV integration considering the economic and environmental aspects.
Supervisor: Prof. Thomas Parisini, Co-Supervisor: Prof. Alessandro Massi Pavan.

Sept. 2015 - Mar. 2019 **M.Sc. in Electrical and Control Engineering**, *110/110 with Honors.*
University of Trieste in collaboration with Danieli Automation.
Dissertation title: Electric arc furnaces for steel production: energy modelling and innovative control solutions.
Supervisor: Prof. Thomas Parisini.

Sept. 2011 - June 2015 **B.Sc. in Telecommunications and Information Engineering**, *108/110.*
University of Trieste.
Dissertation title: Electric distribution system analysis of University of Trieste: present system and perspectives for redesign.
Supervisor: Prof. Giorgio Sulligoi.

Sept. 2008 - June 2011 **Technical Diploma in Electronics**, *98/100.*
IPSIA "A.Mattioni", Cividale del Friuli (UD).

Professional Experience

Dec. 2022 - Present (9 months)
Postdoctoral Research Fellow
Dept. of Engineering and Architecture, University of Trieste, Trieste, Italy.
Topic: A Holistic Monitoring and Diagnostic Tool for Photovoltaic Generators (HOTSPHOT).
Supervisor: Prof. Alessandro Massi Pavan.
Funding: PRIN2020–HOTSPHOT 2020.

Aug. 2021 - April 2022 (9 months)
Visiting Ph.D. Student
Chair of Power Electronics, Faculty of Engineering, Christian Albrechts-Universität zu Kiel, Kiel, Germany.
Topic: DAB converter control and new efficiency-driven charging strategies for EVs.
Supervisor: Prof. Marco Liserre, Co-Supervisors: Dr.Ing. Hamzeh Beiranvand, Dr.Ing. Thiago Pereira.

Mar. 2021 - Mar.2022 (1 year)
Research Fellow
Dept. of Engineering and Architecture, University of Trieste, Trieste, Italy.
Topic: V2G at the University of Trieste for a partnership between electric vehicles and the electricity grid.
Supervisors: Prof. Thomas Parisini and Prof. Alessandro Massi Pavan.
Funding: University Research Funding (FRA - Fondi Ricerca Ateneo)

Dec. 2019 - Dec.2020 (1 year)
Research Fellow
Dept. of Engineering and Architecture, University of Trieste, Trieste, Italy.
Topic: DEEP-SEA: Development of Energy Efficiency Planning and Services for the Mobility of Adriatic Marinas.
Supervisor: Prof. Alessandro Massi Pavan.
Funding: Interreg Italy-Croatia.

Nov. 2019 - Oct. 2022 (3 years)
Ph.D. Student
Dept. of Engineering and Architecture, University of Trieste, Trieste, Italy.
Topic: Energy management systems and optimization strategies for EV integration considering the economic and environmental aspects.
Supervisor: Prof. Thomas Parisini, Co-Supervisor: Prof. Alessandro Massi Pavan.

Mar. 2018 - Mar. 2019 (1 year)
Internship
Danieli Automation S.p.a., Buttrio, Italy.
Topic: Electric arc furnaces for steel production: energy modelling and electrical simulations.
Supervisor: Prof. Thomas Parisini, Co-Supervisors: Ing. Federico Pasut, Ing. Scheila Marcuzzi, Ing. Mordeglia Antonello.

Jul. 2018 - Aug. 2018 (2 month)
Internship
AMP Engineering Consulting Limited, London, United Kingdom.
Topic: Development of innovative control systems for EAF and their modelling.
Supervisors: Prof. Thomas Parisini, Prof. Paul Mitcheson, Prof. Alessandro Astolfi.

2009 (3 months)
Employee
Electrician at Elettrica Ducale S.r.l., Cividale del Friuli, Italy.

Participation in the Activities of a Research Group Characterized by Collaborations at the National or International Level

This section reports national and international collaborations that lead to publications or organization of editorial initiatives.

Member of the Group of Electrical engineering

Member of the "Electrical engineering" research group at the Dept. of Engineering and Architecture, University of Trieste, coordinated by Prof. Alessandro Massi Pavan. The research activities fall within the electrotechnical field (09/E1 - Elettrotecnica), such as photovoltaic systems, electric mobility, storage systems, smart grids and renewable energy communities. In the field of photovoltaics, research studies focus on power forecasting and on monitoring and diagnosing tools. With reference to the integration of electric mobility with electric grids, predictive control techniques have been developed to consider uncertainties in the real-time management of energy flows within charging stations powered by photovoltaic generators and storage systems, as well as the study of vehicle-to-grid systems. A further line of research concerns the techno-economic and environmental analysis of renewable energy communities, one of the emerging solutions to reduce energy poverty and spread the use of renewable energy sources. Both these and related activities were carried out in collaboration with:

- **University of Salerno, Department of Information and Electrical Engineering and Applied Mathematics, Salerno, Italy** with **Prof. Giovanni Spagnuolo, Prof. Giovanni Petrone** and **Dr. Ana Cabrera-Tobar** as witnessed by the following published articles:

  1. **Demand response of an Electric Vehicle charging station using a robust-explicit model predictive control considering uncertainties to minimize carbon intensity**. By Ana Cabrera-Tobar, Nicola Blasuttigh, Alessandro Massi Pavan, and Giovanni Spagnuolo. In: *Sustainable Energy, Grids and Networks* 38 (**June 2024**), p. 101381. ISSN: 2352-4677. DOI: 10.1016/j.segan.2024.101381
  2. **Real time Energy Management System of a photovoltaic based e-vehicle charging station using Explicit Model Predictive Control accounting for uncertainties**. en. By Ana Cabrera-Tobar, Alessandro Massi Pavan, Nicola Blasuttigh, Giovanni Petrone, and Giovanni Spagnuolo. In: *Sustainable Energy, Grids and Networks* 31 (**Sept. 2022**), p. 100769. ISSN: 2352-4677. DOI: 10.1016/j.segan.2022.100769
  3. **Energy Scheduling and Performance Evaluation of an e-Vehicle Charging Station**. en. By Ana Cabrera-Tobar, Nicola Blasuttigh, Alessandro Massi Pavan, Vanni Lughi, Giovanni Petrone, and Giovanni Spagnuolo. In: *Electronics* 11.23 (**Jan. 2022**), p. 3948. ISSN: 2079-9292. DOI: 10.3390/electronics11233948

- **Politecnico of Milan, Department of Electronics, Information and Bioengineering, Milan, Italy** with **Prof. Enrico Tironi** and **Dr. Simone Negri** as witnessed by the following special issue, special session and published articles:

  1. **MDPI Energies** (ISSN 1996-1073) Special issue - Synergizing Sustainability: Smart Strategies for Enhancing Energy, Economic, Environmental, and Social Performance in Residential and Industrial Renewable Energy Communities together with Prof. Alessandro Massi Pavan and Dr. Simone Negri - link
  2. **EEEIC 2024** - Special Session on *Smart Strategies for Reliability, Technical and 3E Assessment in Renewable Energy Systems* with Dr. Simone Negri
  3. **Economic and Environmental Assessment of Industrial Renewable Energy Communities**. By Simone Negri, Nicola Blasuttigh, Claudio Pagani, Alessandro Massi Pavan, and Stefano Pastore. In: *EEEIC 2024*. **2024** *Accepted, in press*
  4. **Optimal Sizing and Environ-Economic Analysis of PV-BESS Systems for Jointly Acting Renewable Self-Consumers**. en. By Nicola Blasuttigh, Simone Negri, Alessandro Massi Pavan, and Enrico Tironi. In: *Energies* 16.3 (**Jan. 2023**), p. 1244. ISSN: 1996-1073. DOI: 10.3390/en16031244
  5. **Economic and Environmental Impact of Electric Vehicles Trends on Jointly-Acting Renewable Self-Consumers Groups**. By Nicola Blasuttigh, Simone Negri, and Alessandro Massi Pavan. In: *IEEE EUROCON 2023 - 20th International Conference on Smart Technologies*. **July 2023**, pp. 360–365. DOI: 10.1109/EUROCON56442.2023.10199060
  6. **Combined model predictive control and ANN-based forecasters for jointly acting renewable self-consumers: An environmental and economical evaluation**. en. By Simone Negri, Federico Giani, Nicola Blasuttigh, Alessandro Massi Pavan, Adel Mellit, and Enrico Tironi. In: *Renewable Energy* (**July 2022**). ISSN: 0960-1481. DOI: 10.1016/j.renene.2022.07.065

- **Christian-Albrechts-Universität zu Kiel, Technische Fakultät, Kiel, Germany** with the **Chair of Power Electronics, Prof. Marco Liserre, Dr.Ing. Hamzeh Beiranvand** and **Dr.Ing. Thiago Pereira** as witnessed by the following published articles:

  1. **$\eta_{\max}$-Charging Strategy for Lithium-Ion Batteries: Theory, Design, and Validation**. By Nicola Blasuttigh, Hamzeh Beiranvand, Thiago Pereira, Simone Castellan, Alessandro Massi Pavan, and Marco Liserre. In: *IEEE Transactions on Power Electronics* (**2024**). Conference Name: IEEE Transactions on Power Electronics, pp. 1–12. ISSN: 1941-0107. DOI: 10.1109/TPEL.2024.3381644
  2. **Efficiency Trade-off-Oriented Analysis for the integration of DC-DC Converter and Battery Pack in V2G Applications**. By Nicola Blasuttigh, Hamzeh Beiranvand, Thiago Pereira, Simone Castellan, and Marco Liserre. In: *2022 IEEE Energy Conversion Congress and Exposition (ECCE)*. **Oct. 2022**, pp. 1–7. DOI: 10.1109/ECCE50734.2022.9947733
  3. **$\eta_{\max}$-Charging Strategy for Lithium-Ion Batteries in V2G Applications**. By Hamzeh Beiranvand, Nicola Blasuttigh, Thiago Pereira, Sandra Hansen, Helge Krueger, Marco Liserre, and Alessandro Massi Pavan. In: *2022 IEEE Energy Conversion Congress and Exposition (ECCE)*. ISSN: 2329-3748. **Oct. 2022**, pp. 1–8. DOI: 10.1109/ECCE50734.2022.9947572
  4. **Comparative Study of Single-phase and Three-phase DAB for EV Charging Application**. By Nicola Blasuttigh, Hamzeh Beiranvand, Thiago Pereira, and Marco Liserre. In: *2022 24th European Conference on Power Electronics and Applications (EPE'22 ECCE Europe)*. **Sept. 2022**, pp. 1–9 link

- **University of Jijel, Department of Electronics, Jijel, Algeria** with the Renewable Energy Laboratory, **Prof. Adel Mellit** as witnessed by the following published articles:

  1. **A Novel Embedded System for Real-Time Fault Diagnosis of Photovoltaic Modules**. By Zakaria Ksira, Adel Mellit, Nicola Blasuttigh, and Alessandro Massi Pavan. In: *IEEE Journal of Photovoltaics* (**2024**), pp. 1–9. ISSN: 2156-3403. DOI: 10.1109/JPHOTOV.2024.3359462
  2. **TinyML Model for Fault Classification of Photovoltaic Modules Based on Visible Images**. en. By Z. Ksira, N. Blasuttigh, A. Mellit, and A. Massi Pavan. In: *IoT-Enabled Energy Efficiency Assessment of Renewable Energy Systems and Micro-grids in Smart Cities*. Vol. 984. Series Title: Lecture Notes in Networks and Systems. Cham: Springer Nature Switzerland, **2024**, pp. 373–380. ISBN: 978-3-031-60628-1 978-3-031-60629-8. DOI: 10.1007/978-3-031-60629-8_37
  3. **TinyML for fault diagnosis of Photovoltaic Modules using Edge Impulse Platform**. By Adel Mellit, Nicola Blasuttigh, and Alessandro Massi Pavan. In: *2023 11th International Conference on Smart Grid (icSmartGrid)*. **June 2023**, pp. 01–05. DOI: 10.1109/icSmartGrid58556.2023.10171088
  4. **Combined model predictive control and ANN-based forecasters for jointly acting renewable self-consumers: An environmental and economical evaluation**. en. By Simone Negri, Federico Giani, Nicola Blasuttigh, Alessandro Massi Pavan, Adel Mellit, and Enrico Tironi. In: *Renewable Energy* (**July 2022**). ISSN: 0960-1481. DOI: 10.1016/j.renene.2022.07.065

- **University of Maribor, Faculty of Chemistry and Chemical Engineering** with the Laboratory For Process Systems Engineering And Sustainable Development, **Dr. Annamaria Vujanović and Dr. Damjan Krajnc** as witnessed by the published article:

  1. **Assessing the Environmental and Biodiversity Impacts of a New Cableway System: A Comprehensive Life Cycle Assessment**. By Annamaria Vujanović, Andrea Mio, Rok Pučnik, Nicola Blasuttigh, Damjan Krajnc, and Maurizio Fermeglia. In: *Journal of Cleaner Production* (**2024**) *Conditionally accepted, under revision*

- **University of Padova, Department of Industrial Engineering (DII)** with **Prof. Giuseppe Buja** as witnessed by the published article:

  1. **Design and simulation of a vehicle-to-grid system**. By Simone Castellan, Nicola Blasuttigh, Roberto Menis, Alessandro Massi Pavan, Mario Mezzarobba, and Giuseppe Buja. In: *2020 6th International Conference on Electric Power and Energy Conversion Systems (EPECS)*. IEEE, **2020**, pp. 69–74. DOI: 10.1109/EPECS48981.2020.9304957

Collaboration in Scientific Studies and Research Funded by Public or Private Bodies

Sept. 2022 - Mar. 2023 **Consorzio di Sviluppo Economico Locale dell'Area Giuliana**, *7 months*
Trieste Zona industriale Net Zero.
The Trieste Net Zero project aims to address environmental and energy challenges in the COSELAG companies. After a detailed analysis of consumption and energy sources used by the companies involved, the second part of the project focuses on photovoltaic systems and renewable energy communities solutions. The third part of the project proposes concrete actions, such as the identification of areas for photovoltaic installations, the creation of renewables energy communities and projects for district heating, geothermal energy and the reduction of the environmental impact of transport through electric and hydrogen charging stations. Specifically, Dr. Nicola Blasuttigh was responsible for data acquisition and processing, electricity consumption profile estimation, potential production of photovoltaic systems and economic analysis, simulation of renewable energy community and reporting.

May. 2023 - Febr. 2024 **Elettra Sincrotrone Trieste S.C.p.A.**, *10 months*
Design, sizing and performance evaluation of a photovoltaic generator and energy storage system for energy efficiency at Elettra Sincrotrone.
The research project aims to develop and optimize the design and sizing of a photovoltaic system for the multidisciplinary research center Elettra Sincrotrone Trieste. The primary objective is to maximize self-production of solar energy by evaluating the sizing of the system, layout, and annual yield. Additionally, the feasibility of integrating an energy storage system is assessed to enhance energy independence from the grid. The project is divided into three main sections: preliminary sizing of the PV system, including 3D layouts, nominal powers, annual yield, and hourly profiles of produced power; energetic and environmental analysis in terms of self-consumption, self-sufficiency and CO_2 reduction considering various scenarios, including the installation of a battery storage system; economic evaluation in terms of cash flows, providing an assessment of the investment payback times and net present values. Specifically, Dr. Nicola Blasuttigh was responsible for data acquisition and processing, PV system design and 3D layout, performance characterization, battery energy storage system sizing, simulation of energy flows, energy management system development, economic and environmental analysis and reporting.

Collaboration in International and National Research Projects Funded by Competitive Tenders

Nov. 2019 - March 2020 **Interreg V-A Italia-Slovenija 2014-2020**, *Budget 1.407.133 €, 5 months - 32% University of Trieste*
MUSE - Collaborazione transfrontaliera per la Mobilità Universitaria Sostenibilie energeticamente Efficiente.
The MUSE project aims to improve energy efficiency in the mobility of international local authorities, to strengthen skills in sustainable mobility planning, to promote cross-border cooperation and to implement innovative services. The aim is to develop guidelines for integrating energy efficiency in urban, suburban and cross-border mobility. The project has improved the capacity of public administrations to design eco-friendly mobility services, offering more sustainable options to students and university employees. The activities include the testing of energy-efficient solutions with electric vehicles, micro-grid logic, renewable energy and intelligent systems for monitoring and managing mobility services, supported by ICT. Dr. Nicola Blasuttigh was involved in the project where his main contribution was related to the acquisition of data provided by the BMS of the electric vehicle, the control of the charging power of the charging stations and the development of a real-time controller for microgrid energy management with dSPACE systems. The following published article are directly related to the project:

1. **Demand response of an Electric Vehicle charging station using a robust-explicit model predictive control considering uncertainties to minimize carbon intensity**. By Ana Cabrera-Tobar, Nicola Blasuttigh, Alessandro Massi Pavan, and Giovanni Spagnuolo. In: *Sustainable Energy, Grids and Networks* 38 (**June 2024**), p. 101381. ISSN: 2352-4677. DOI: 10.1016/j.segan.2024.101381
2. **Real time Energy Management System of a photovoltaic based e-vehicle charging station using Explicit Model Predictive Control accounting for uncertainties**. en. By Ana Cabrera-Tobar, Alessandro Massi Pavan, Nicola Blasuttigh, Giovanni Petrone, and Giovanni Spagnuolo. In: *Sustainable Energy, Grids and Networks* 31 (**Sept. 2022**), p. 100769. ISSN: 2352-4677. DOI: 10.1016/j.segan.2022.100769
3. **Energy Scheduling and Performance Evaluation of an e-Vehicle Charging Station**. en. By Ana Cabrera-Tobar, Nicola Blasuttigh, Alessandro Massi Pavan, Vanni Lughi, Giovanni Petrone, and Giovanni Spagnuolo. In: *Electronics* 11.23 (**Jan. 2022**), p. 3948. ISSN: 2079-9292. DOI: 10.3390/electronics11233948

Furthermore, Dr. Nicola Blasuttigh presented the results of the project during the final event:

- **Interreg cooperation between Italy and Slovenia: discover European projects and future opportunities**. Organized at Hotel Savoia, Trieste, 21 September 2022

Dec. 2019 - Nov. 2020 **Interreg Italia-Croatia**, *Budget 2.511.567 €, 12 months - 8% University of Trieste*
DEEP-SEA - Development of Energy Efficiency Planning and Services for the Mobility of Adriatic Marinas.
The research project focused on the study and development of mathematical models to optimise electricity flows in microgrids powered by photovoltaic systems in Adriatic marinas. The optimisation considers photovoltaic production, its variability, the state of charge of the storage, economic and environmental costs, with a focus on loads such as electric vehicles and boats, and their integration into the microgrid. Dr. Nicola Blasuttigh was responsible for the development of a real-time monitoring system for PV-BESS systems based on RS485 and RestAPI protocols over TCP/IP, the development and optimisation of the energy management system, testing procedures, and the preparation of reports and guidelines for the installation of PV-BESS systems to recharge EVs and e-boats in marinas. The following published article are directly related to the project:

1. **Demand response of an Electric Vehicle charging station using a robust-explicit model predictive control considering uncertainties to minimize carbon intensity**. By Ana Cabrera-Tobar, Nicola Blasuttigh, Alessandro Massi Pavan, and Giovanni Spagnuolo. In: *Sustainable Energy, Grids and Networks* 38 (**June 2024**), p. 101381. ISSN: 2352-4677. DOI: 10.1016/j.segan.2024.101381
2. **Real time Energy Management System of a photovoltaic based e-vehicle charging station using Explicit Model Predictive Control accounting for uncertainties**. en. By Ana Cabrera-Tobar, Alessandro Massi Pavan, Nicola Blasuttigh, Giovanni Petrone, and Giovanni Spagnuolo. In: *Sustainable Energy, Grids and Networks* 31 (**Sept. 2022**), p. 100769. ISSN: 2352-4677. DOI: 10.1016/j.segan.2022.100769
3. **Energy Scheduling and Performance Evaluation of an e-Vehicle Charging Station**. en. By Ana Cabrera-Tobar, Nicola Blasuttigh, Alessandro Massi Pavan, Vanni Lughi, Giovanni Petrone, and Giovanni Spagnuolo. In: *Electronics* 11.23 (**Jan. 2022**), p. 3948. ISSN: 2079-9292. DOI: 10.3390/electronics11233948

Dec. 2022 - Nov. 2024 **PRIN2020**, *Budget 1.103.310 €, 24 months - 18% University of Trieste*
HOTSPHOT - A holistic monitoring and diagnostic tool for photovoltaic generators

The project aims to study and implement techniques for classification and correlation between symptoms and faults through the analysis of electrical measurements and infrared images on PV modules. An holistic approach embedding both "model-based" and "data-driven" methods are designed, implemented and tested at the laboratories "Photovoltaics" and "Smart Grid and Electric Mobility" of the Department of Engineering and Architecture of the University of Trieste. The project also focuses on the development of a monitoring system operating in real time related to the main operating parameters of photovoltaic generators also integrated in nanogrids developed for powering electric vehicles. The group to which Dr. Nicola Blasuttigh belongs was responsible for symptoms classification by images and electrical measurements, and symptoms versus failures correlations. The following published articles are directly related to the project:

1. **A Novel Embedded System for Real-Time Fault Diagnosis of Photovoltaic Modules**. By Zakaria Ksira, Adel Mellit, Nicola Blasuttigh, and Alessandro Massi Pavan. In: *IEEE Journal of Photovoltaics* (**2024**), pp. 1–9. ISSN: 2156-3403. DOI: 10.1109/JPHOTOV.2024.3359462
2. **Thermal Camera Prototype for Predictive Maintenance in Photovoltaic Applications Based on TinyML Embedded System**. By Nicola Blasuttigh, Adel Mellit, Alessandro Massi Pavan, and Marco Zennaro. In: *Electrimacs 2024*. **2024** *Accepted, in press*
3. **TinyML for fault diagnosis of Photovoltaic Modules using Edge Impulse Platform**. By Adel Mellit, Nicola Blasuttigh, and Alessandro Massi Pavan. In: *2023 11th International Conference on Smart Grid (icSmartGrid)*. **June 2023**, pp. 01–05. DOI: 10.1109/icSmartGrid58556.2023.10171088
4. **TinyML Model for Fault Classification of Photovoltaic Modules Based on Visible Images**. en. By Z. Ksira, N. Blasuttigh, A. Mellit, and A. Massi Pavan. In: *IoT-Enabled Energy Efficiency Assessment of Renewable Energy Systems and Micro-grids in Smart Cities*. Vol. 984. Series Title: Lecture Notes in Networks and Systems. Cham: Springer Nature Switzerland, **2024**, pp. 373–380. ISBN: 978-3-031-60628-1 978-3-031-60629-8. DOI: 10.1007/978-3-031-60629-8_37

Teaching Activities

All the following teaching activities have been performed at the Dept. of Engineering and Architecture, University of Trieste.

Seminars - 24 hours

- **Adapt your future: let's talk about climate change**, with a talk entitled "Smart Grids and technologies for the energetic transition", University of Trieste, 4 October 2022 (1 hour)
- **Festival of Sustainable Development: "Transport and energy: a necessary synergy for sustainability"** with a talk entitled "Vehicle-to-Ski: an alliance between ski resorts and electric vehicles", University of Trieste, 26 October 2022 (1 hour)
- **V2G, EMS and battery degradation aspects**, M.Sc. in Electrical Engineering, University of Trieste, a.y. 2020-2021, 2021-2022, 2023-2024, during the course "Azionamenti elettrici" (Electric drives) (9 hours overall)
- **Batteries: Definitions, basics and modelling**, M.Sc. in Materials And Chemical Engineering For Nano, Bio, And Sustainable Technologies, University of Trieste, a.y. 2022-2023, 2023-2024, during the course "Materials and Systems for the Energy Transition (Systems module)" (6 hours overall)
- **Energy management and optimization strategies**, M.Sc. in Materials And Chemical Engineering For Nano, Bio, And Sustainable Technologies, University of Trieste, a.y. 2022-2023, 2023-2024, during the course "Materials and Systems for the Energy Transition (Systems module)" (6 hours overall)
- **Energy management and 3E (energy, economic, environmental) indicators**, Ph.D. course in Circular Economy, University of Trieste, a.y. 2023-2024 (1 hour)

Teaching assistant - 85 hours

- **Elettrotecnica (Electrical Engineering)**, B.Sc. in Civil and Environmental Engineering, and Industrial Engineering, University of Trieste, a.y. 2020-2021, 2022-2023, 2023-2024 (65 hours) 200 students
- **Principi di Ingegneria Elettrica (Fundamentals of Electrical Engineering)**, B.Sc. in Industrial Engineering, University of Trieste, a.y. 2020-2021, 2022-2023, 2023-2024 (9 hours) 70 students
- **Teoria dei Circuiti (Circuit Theory)**, B.Sc. in Electronic and Computer Engineering, University of Trieste, a.y. 2020-2021, 2022-2023, 2023-2024 (11 hours) 11 students

B.Sc. Thesis Co-Supervision

- **Riccardo Carbonera:** *Dimensionamento di massima di un impianto fotovoltaico industriale dal punto di vista energetico, economico e ambientale.*
- **Zakaria Nemer:** *Profili di Consumo Residenziali e Industriali: Ricerca di Open Datasets per lo Sviluppo dei Sistemi di Gestione dell'Energia Elettrica.*
- **Alberto Zamolo:** *Analisi energetica e ambientale della stazione di ricarica fotovoltaica per veicoli elettrici dell'Università di Trieste: stato attuale e prospettive future.*
- **Samuel Di Meglio:** *Analisi tecno-economica di Impianti fotovoltaici con Accumulo e loro Dimensionamento tramite il "Self-Consumption-Sufficiency-Balance".*
- **Valentina Tomasella:** *Simulazione delle prestazioni di una pompa di calore residenziale abbinata ad un impianto fotovoltaico e ad un sistema di accumulo dell'energia.*
- **Leonardo Bidogia:** *Studio delle prestazioni di una nano-grid domestica: vantaggi e svantaggi del "Vehicle-to-Home".*
- **Sofia Chiara D'Arelli:** *Analisi dei consumi energetici e della produzione fotovoltaica di un edificio universitario: il caso studio dell'Edificio B dell'Università di Trieste.*
- **Ongoing:** Nugnes Giuseppe

Cultore della Materia

- **Elettrotecnica (Electrical Engineering)**

Editorial Activities

Since May 2024, he is **Associate Editor** for the *IEEE Journal of Photovoltaics*.

Journal Special Issue Organization

- **Guest Editor**, MDPI Energies (ISSN 1996-1073): *Synergizing Sustainability: Smart Strategies for Enhancing Energy, Economic, Environmental, and Social Performance in Residential and Industrial Renewable Energy Communities* with Prof. Alessandro Massi Pavan and Dr. Simone Negri - link

Conference Special Session Organizer

- **EEEIC 2024** *Smart Strategies for Reliability, Technical and 3E Assessment in Renewable Energy Systems* with Dr. Simone Negri

Conference Session Chair

- **Electrimacs 2024**, TT1 - SS3 - Modelling, simulation and identification with Dr. Maria Carmela Di Piazza
- **Electrimacs 2024**, TT1 - SS5 - Modelling, simulation and identification with Dr. Mohamed Bahloul
- **EEEIC 2024**, *"Smart Strategies for Reliability, Technical and 3E Assessment in Renewable Energy Systems"* with Dr. Simone Negri, Rome, Italy
- **IEEE EUROCON 2023**, *"Grid integration B"* with Dr. Marziyeh Hemmati, Torino, Italy

Conference Speaker

- **Electrimacs 2024** *"Thermal Camera Prototype for Predictive Maintenance in Photovoltaic Applications Based on TinyML Embedded System"* presented in the session SS1 - TT4, "Numerical Methods And Machine Learning"
- **EEEIC 2024** *"Economic and Environmental Assessment of Industrial Renewable Energy Communities"* presented in the special session "Smart Strategies for Reliability, Technical and 3E Assessment in Renewable Energy Systems"
- **ECCE 2022** *"Efficiency Trade-off-Oriented Analysis for the integration of DC-DC Converter and Battery Pack in V2G Applications"*, video presentation for the session "Devices V2G Applications"
- **IEEE EUROCON 2023** *"Economic and Environmental Impact of Electric Vehicles Trends on Jointly-Acting Renewable Self-Consumers Groups"* presented in the session "Grid services and flexibility "
- **icSmartGrid 2023** *"TinyML for fault diagnosis of Photovoltaic Modules using Edge Impulse Platform"* presented in the session "Session 5"
- **ET2022** *"Vehicle-to-Grid: a multi-level approach for minimising losses, costs and environmental impact"* presented at "XXXVI Riunione Annuale dei Ricercatori di Elettrotecnica"

Awards and Memberships

Awards

- The manuscript *"TinyML for fault diagnosis of Photovoltaic Modules using Edge Impulse Platform"* authored by Adel Mellit, Nicola Blasuttigh and Alessandro Massi Pavan (DOI: 10.1109/icSmartGrid58556.2023.10171088) received the **best paper award** of the 11th International Conference On Smart Grid, icSmartGrid 2023.
- The article *"Energy Scheduling and Performance Evaluation of an e-Vehicle Charging Station"* authored by Ana Cabrera-Tobar ,Nicola Blasuttigh, Alessandro Massi Pavan, Vanni Lughi, Giovanni Petrone and Giovanni Spagnuolo (DOI: 10.3390/electronics11233948) has been selected as **cover paper** among 228 articles for the journal Electronics (ISSN 2079-9292), Volume 11, Issue 23, 2022
- The article *"A Novel Embedded System for Real-Time Fault Diagnosis of Photovoltaic Modules"* authored by Zakaria Ksira, Adel Mellit, Nicola Blasuttigh and Alessandro Massi Pavan (DOI: 10.1109/JPHOTOV.2024.3359462) has been selected as **cover paper** among 21 articles for the journal IEEE Journal of Photovoltaics (ISSN 2156-3381), Volume 14, Issue 2, 2024

Memberships

Jan. 2023 - Present **IEEE Member**, *97182281*
Institute of Electrical and Electronics Engineers.

Jan. 2023 - Present **IEEE IES Member**
IEEE Industrial Electronics Society.

Jan. 2015 - Dec.2016 **AEIT Member**, *116819*
Associazione Italiana di Elettrotecnica, Elettronica, Automazione, Informatica e Telecomunicazioni.

Scientific Production

updated to: 10/06/2024

ORCID: 0000-0002-5045-3636 | Scopus ID: 57221647090 | Google Scholar: link
Publications: 16 | h-index: 5 | Citations: 80 (source: Scopus)

Articles Published on International Journals

[J1] **Assessing the Environmental and Biodiversity Impacts of a New Cableway System: A Comprehensive Life Cycle Assessment**. By Annamaria Vujanović, Andrea Mio, Rok Pučnik, Nicola Blasuttigh, Damjan Krajnc, and Maurizio Fermeglia. In: *Journal of Cleaner Production* (**2024**) *Conditionally accepted, under revision*

[J2] **Demand response of an Electric Vehicle charging station using a robust-explicit model predictive control considering uncertainties to minimize carbon intensity**. By Ana Cabrera-Tobar, Nicola Blasuttigh, Alessandro Massi Pavan, and Giovanni Spagnuolo. In: *Sustainable Energy, Grids and Networks* 38 (**June 2024**), p. 101381. ISSN: 2352-4677. DOI: 10.1016/j.segan.2024.101381

[J3] **$\eta_{\max}$-Charging Strategy for Lithium-Ion Batteries: Theory, Design, and Validation**. By Nicola Blasuttigh, Hamzeh Beiranvand, Thiago Pereira, Simone Castellan, Alessandro Massi Pavan, and Marco Liserre. In: *IEEE Transactions on Power Electronics* (**2024**). Conference Name: IEEE Transactions on Power Electronics, pp. 1–12. ISSN: 1941-0107. DOI: 10.1109/TPEL.2024.3381644

[J4] **A Novel Embedded System for Real-Time Fault Diagnosis of Photovoltaic Modules**. By Zakaria Ksira, Adel Mellit, Nicola Blasuttigh, and Alessandro Massi Pavan. In: *IEEE Journal of Photovoltaics* (**2024**), pp. 1–9. ISSN: 2156-3403. DOI: 10.1109/JPHOTOV.2024.3359462

[J5] **Optimal Sizing and Environ-Economic Analysis of PV-BESS Systems for Jointly Acting Renewable Self-Consumers**. en. By Nicola Blasuttigh, Simone Negri, Alessandro Massi Pavan, and Enrico Tironi. In: *Energies* 16.3 (**Jan. 2023**), p. 1244. ISSN: 1996-1073. DOI: 10.3390/en16031244

[J6] **Simulating the Diffusion of Residential Rooftop Photovoltaic, Battery Storage Systems and Electric Cars in Italy. An Exploratory Study Combining a Discrete Choice and Agent-Based Modelling Approach**. en. By Romeo Danielis, Mariangela Scorrano, Alessandro Massi Pavan, and Nicola Blasuttigh. In: *Energies* 16.1 (**Jan. 2023**), p. 557. ISSN: 1996-1073. DOI: 10.3390/en16010557

[J7] **Energy Scheduling and Performance Evaluation of an e-Vehicle Charging Station**. en. By Ana Cabrera-Tobar, Nicola Blasuttigh, Alessandro Massi Pavan, Vanni Lughi, Giovanni Petrone, and Giovanni Spagnuolo. In: *Electronics* 11.23 (**Jan. 2022**), p. 3948. ISSN: 2079-9292. DOI: 10.3390/electronics11233948

[J8] **Vehicle-to-Ski: A V2G Optimization-Based Cost and Environmental Analysis for a Ski Resort**. By Nicola Blasuttigh, Stefano Pastore, Mariangela Scorrano, Romeo Danielis, and Alessandro Massi Pavan. In: *Sustainable Energy Technologies and Assessments* (**2022**). DOI: 10.1016/j.seta.2022.102916

[J9] **Real time Energy Management System of a photovoltaic based e-vehicle charging station using Explicit Model Predictive Control accounting for uncertainties**. en. By Ana Cabrera-Tobar, Alessandro Massi Pavan, Nicola Blasuttigh, Giovanni Petrone, and Giovanni Spagnuolo. In: *Sustainable Energy, Grids and Networks* 31 (**Sept. 2022**), p. 100769. ISSN: 2352-4677. DOI: 10.1016/j.segan.2022.100769

[J10] **Combined model predictive control and ANN-based forecasters for jointly acting renewable self-consumers: An environmental and economical evaluation**. en. By Simone Negri, Federico Giani, Nicola Blasuttigh, Alessandro Massi Pavan, Adel Mellit, and Enrico Tironi. In: *Renewable Energy* (**July 2022**). ISSN: 0960-1481. DOI: 10.1016/j.renene.2022.07.065

Papers Presented in International Scientific Conferences

[C1] **Economic and Environmental Assessment of Industrial Renewable Energy Communities**. By Simone Negri, Nicola Blasuttigh, Claudio Pagani, Alessandro Massi Pavan, and Stefano Pastore. In: *EEEIC 2024*. **2024** *Accepted, in press*

[C2] **Thermal Camera Prototype for Predictive Maintenance in Photovoltaic Applications Based on TinyML Embedded System**. By Nicola Blasuttigh, Adel Mellit, Alessandro Massi Pavan, and Marco Zennaro. In: *Electrimacs 2024*. **2024** *Accepted, in press*

[C3] **TinyML Model for Fault Classification of Photovoltaic Modules Based on Visible Images**. en. By Z. Ksira, N. Blasuttigh, A. Mellit, and A. Massi Pavan. In: *IoT-Enabled Energy Efficiency Assessment of Renewable Energy Systems and Micro-grids in Smart Cities*. Vol. 984. Series Title: Lecture Notes in Networks and Systems. Cham: Springer Nature Switzerland, **2024**, pp. 373–380. ISBN: 978-3-031-60628-1 978-3-031-60629-8. DOI: 10.1007/978-3-031-60629-8_37

[C4] **TinyML for fault diagnosis of Photovoltaic Modules using Edge Impulse Platform**. By Adel Mellit, Nicola Blasuttigh, and Alessandro Massi Pavan. In: *2023 11th International Conference on Smart Grid (icSmartGrid)*. **June 2023**, pp. 01–05. DOI: 10.1109/icSmartGrid58556.2023.10171088

[C5] **Economic and Environmental Impact of Electric Vehicles Trends on Jointly-Acting Renewable Self-Consumers Groups**. By Nicola Blasuttigh, Simone Negri, and Alessandro Massi Pavan. In: *IEEE EUROCON 2023 - 20th International Conference on Smart Technologies*. **July 2023**, pp. 360–365. DOI: 10.1109/EUROCON56442.2023.10199060

[C6] **Comparative Study of Single-phase and Three-phase DAB for EV Charging Application**. By Nicola Blasuttigh, Hamzeh Beiranvand, Thiago Pereira, and Marco Liserre. In: *2022 24th European Conference on Power Electronics and Applications (EPE'22 ECCE Europe)*. **Sept. 2022**, pp. 1–9 link

[C7] **$\eta_{\max}$-Charging Strategy for Lithium-Ion Batteries in V2G Applications**. By Hamzeh Beiranvand, Nicola Blasuttigh, Thiago Pereira, Sandra Hansen, Helge Krueger, Marco Liserre, and Alessandro Massi Pavan. In: *2022 IEEE Energy Conversion Congress and Exposition (ECCE)*. ISSN: 2329-3748. **Oct. 2022**, pp. 1–8. DOI: 10.1109/ECCE50734.2022.9947572

[C8] **Efficiency Trade-off-Oriented Analysis for the integration of DC-DC Converter and Battery Pack in V2G Applications**. By Nicola Blasuttigh, Hamzeh Beiranvand, Thiago Pereira, Simone Castellan, and Marco Liserre. In: *2022 IEEE Energy Conversion Congress and Exposition (ECCE)*. **Oct. 2022**, pp. 1–7. DOI: 10.1109/ECCE50734.2022.9947733

[C9] **Technologies for Electric Vehicle Utilization for Electric Power Optimal Management**. By Mario Mezzarobba, Alberto Tessarolo, Nicola Blasuttigh, Alessandro Massi Pavan, Simone Castellan, and Stefano Pastore. In: *2021 AEIT International Conference on Electrical and Electronic Technologies for Automotive (AEIT AUTOMOTIVE)*. **Nov. 2021**, pp. 1–6. DOI: 10.23919/AEITAUTOMOTIVE52815.2021.9662761

[C10] **Design and simulation of a vehicle-to-grid system**. By Simone Castellan, Nicola Blasuttigh, Roberto Menis, Alessandro Massi Pavan, Mario Mezzarobba, and Giuseppe Buja. In: *2020 6th International Conference on Electric Power and Energy Conversion Systems (EPECS)*. IEEE, **2020**, pp. 69–74. DOI: 10.1109/EPECS48981.2020.9304957

Preprints

[P1] **$\eta_{\max}$-Charging Strategy for Lithium-Ion Batteries: Theory, Design, and Validation**. By Nicola Blasuttigh, Hamzeh Beiranvand, Thiago Pereira, Alessandro Massi Pavan, and Marco Liserre. In: *TechRxiv* (**2023**). DOI: 10.36227/techrxiv.23708922.v1

[P2] **Vehicle-to-Ski: A V2g Optimization-Based Cost and Environmental Analysis for a Ski Resort**. By Nicola Blasuttigh, Stefano Pastore, Mariangela Scorrano, Romeo Danielis, and Alessandro Massi Pavan. In: *SSRN* (**2022**). DOI: 10.2139/ssrn.4126159

Thesis and Dissertations

[I1] Nicola Blasuttigh (2023). **Energy management systems and optimization strategies for EV integration considering the economic and environmental aspects**, Ph.D. Dissertation. University of Trieste. Ph.D. in Industrial and Information Engineering. Cycle XXXV. Supervisor: Prof. Thomas Parisini. Co-Supervisor: Prof. Alessandro Massi Pavan link

[I2] Nicola Blasuttigh (2019). **Electric arc furnaces for steel production: Energy modelling and innovative control solutions**, M.Sc. Dissertation. University of Trieste. M.Sc. in Electrical Engineering. Supervisor: Prof. Thomas Parisini. Co-Supervisors: Prof. Gianfranco Fenu, Ing. Federico Pasut, Ing. Scheila Marcuzzi, Ing. Mordeglia Antonello link

[I3] Nicola Blasuttigh (2015). **Analisi del sistema di distribuzione di energia elettrica del campus di Piazzale Europa: stato di fatto e prospettive di utilizzo in chiave**, B.Sc. Dissertation. University of Trieste. B.Sc. in Telecommunications and Information Engineering. Supervisor: Prof. Giorgio Sulligoi. Co-Supervisors: Dott. Massimiliano Chiandone

Personal Skills

Language Skills

- **Italian:** native
- **English:** B2

Digital Skills

- **Software Platform:** MATLAB, Simulink, Simscape, PLECS and PVsyst
- **Programming languages:** C,C++, MATLAB/Octave
- **Raster and vector graphics editors:** CorelDraw, Inkscape

Additional Information

Licenses

- Driving License - Cat. A1 and B1.

Dichiarazione di Responsabilità

Il sottoscritto Nicola Blasuttigh, nato a Cividale del Friuli (UD) in data 26.07.1991, residente a Trieste (TS) in Via delle Settefontane 12, consapevole che, ai sensi degli artt. 46 e 47 del DPR 445/2000, consapevole delle sanzioni penali richiamate dall'art. 76 del DPR 445/2000 per dichiarazioni non veritiere o formazione di atti falsi,

DICHIARA:

di possedere ogni titolo riportato nel presente Curriculum Vitae e che ogni informazione sulla produzione scientifica corrisponde a verità.

Trieste, 10/06/2024

Autorizzo il trattamento dei dati personali nelle modalità previste dal Regolamento UE 2016/679.

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