Marco Gallo

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Profile

I am a Marine Engineer with a master's and a PhD in Electrical Engineering from the University of Genoa. My research focuses on optimization algorithms and model-based methods for designing efficient, reliable shipboard power systems, combining physical modeling, simulation, and data-driven approaches.

Education

- **PhD in Electrical Engineering** *UniGe* **Genova, Italy** *Jan 2022 – May 2025*

  Thesis: "Development of Optimization Algorithms for Shipboard Applications"

- **MSc in Naval Architecture and Marine Engineering** *UniGe* **Genova, Italy** *Mar 2019 – Oct 2021*

  GPA: 28/30 - Final grade: 108/110

Journal Publications

- M. Gallo, D. Kaza, F. D'Agostino, M. Cavo, R. Zaccone, F. Silvestro. "Power Plant Design for All-Electric Ships Including the Assessment of Carbon Intensity Indicator" Energy, 2023. link
- F. D'Agostino, M. Gallo, M. Saviozzi, and F. Silvestro, "A Model Predictive Control-Based Energy Management Strategy for Secure Operations in Shipboard Power Systems" TTE, 2024. link

Conference Publications

- F. D'Agostino, M. Gallo, M. Saviozzi, F. Silvestro. "A Security-Constrained Optimal Power Management Algorithm for Shipboard Microgrids with Battery Energy Storage System," IEEE ESARS-ITEC, Venice, Italy, 2023. link
- F. D'Agostino, M. Gallo, F. Sivori, F. Silvestro, A. Chiarelli and G. Grasso, "High-Temperature Superconducting Cables for Shipboard Applications: Design Considerations," IEEE AEIT, Rome, Italy, 2023. link
- F. D'Agostino, M. Gallo, M. Saviozzi, and F. Silvestro, "Performance Investigation of an Optimal Control Strategy for Zero-Emission Operations of Shipboard Microgrids," IEEE SPEEDAM, Naples, Italy, 2024, pp. 1048–1052. link
- F. Silvestro, F. D'Agostino, F. Ghio, A. Rudan, F. Graffione, and M. Gallo, "Investigation on shipboard power quality on cruise ships under high penetration of power converters," iSCSS, 2024. link
- F. D'Agostino, M. Gallo, D. Kaza, F. Silvestro, A. Chiarelli and F. Olcese, "Performance Based Sizing of Battery Energy Storage System for AC Shipboard Microgrid," IEEE EEEIC / I&CPS Europe, Rome, Italy, 2024. link
- G. Bigliani, F. D'Agostino, M. Gallo, D. Kaza and F. Silvestro, "A Two-Stage Optimal Sizing Algorithm for Multi-Energy Smart Port," IEEE PESGM, Seattle, WA, USA, 2024. link
- F. D'Agostino, M. Gallo, D. Kaza, M. Saviozzi and F. Silvestro, "Optimal Sizing of a Multi-Energy Port with Vehicles Charging Capabilities," IEEE ESARS-ITEC, Naples, Italy, 2024. (in proceeding)
- F. D'Agostino, M. Gallo, D. Kaza, F. Silvestro and F. Benevieri, "Load Profile Estimation for Electric Power Load Analysis," IEEE ESARS-ITEC, Naples, Italy, 2024. (in proceeding)
- F. D'Agostino, M. Gallo, M. Saviozzi and F. Silvestro, "An Energy Management Strategy for an Inland Smart Port with Optimal Ferries Allocation," IEEE PESGM, Austin, TX, USA, 2025. (accepted)
- F. D'Agostino, M. Gallo, F. Silvestro, S. Salamone, M. Sozzi and G. Mauri, "An MPC-Based Energy Management System for Fast Shore Charging of Ferries at a Smart Port," 27th International Conference on Electricity Distribution (CIRED 2025), IET, 2025. (presented)
- M. Gallo, C. M. Cooke, J. S. Chalfant, F. D'Agostino and F. Silvestro, "Linearization Techniques for Optimizing Pebb-Based DC Power Corridor Using Mixed-Integer Linear Programming," 2025 AEIT HVDC International Conference (AEIT HVDC), Genova, Italy, 2025. link
- M. Gallo, C. M. Cooke, J. S. Chalfant and F. D'Agostino, "A Multi-Objective Design for PEBB-Based Power Corridors in Shipboard Applications," IEEE Electric Ship Technologies Symposium (ESTS), Alexandria, VA, USA, 2025. (accepted)

For a complete list of publications, please refer to my ResearchGate profile: Marco Gallo - ResearchGate.

Conferences and Seminars

- **Seminar** *MALGA* **Genova, Italy** *2022*

  Participation in the PhD Summer School at MALGA titled "Machine Learning Crash Course 2022" – Prof. Lorenzo Rosasco – June 2022.

- **Seminar** *DIBRIS* **Genova, Italy** *2022*

  Participation in the PhD Summer School at DIBRIS titled "MLCI 2022: Machine Learning – A Computational Intelligence Approach" – May 2022.

- **Conference** *ESARS* **Naples, Italy** *2023*

  At this conference, I presented the paper titled "A Security-Constrained Optimal Power Management Algorithm for Shipboard Microgrids with Battery Energy Storage System".

- **Conference** *AEIT* **Rome, Italy** *2023*

  At this conference, I presented the paper titled "High-Temperature Superconducting Cables for Shipboard Applications: Design Considerations".

- **Seminar** *HITACHI* **Genova, Italy** *2023*

  Control, Automation and Digital solutions to control, optimize and monitor Microgrids, BESS plants, RES, EV.

- **Conference** *ESARS* **Naples, Italy** *2024*

  At this conference, I presented the paper titled "Optimal Sizing of a Multi-Energy Port with Vehicles Charging Capabilities" and "Load Profile stimation for Electric Power Load Analysis".

Experiences

- **Research Internship** *Cetena S.p.A.* **Genova, Italy** *2023*

  Worked on several research projects focused on energy system modeling and data analysis for shipboard applications.

- **Occasional Collaboration Activity** *IESolutions srl* **Genova, Italy** *2023*

  Development of a dynamic simulator for surface ships, front-end design and compilation of the model for stand-alone applications, and preparation of the user manual.

- **President** *Elettra APS* **Genova, Italy** *2024*

  President and co-founder of Elettra APS, a student association designing electric boats for international competitions.

- **Visiting Student** *MIT Sea Grant* **MIT, Cambridge, MA** *2024*

  Joined MIT Sea Grant's visiting student program (June-August 2024) to develop a PEBB sizing algorithm.

- **Member of Electrical Team** *MEMBC* **Monaco, Principality of Monaco** *2023*

  As part of Team Elettra at the University of Genova's DITEN department placed 3rd in the Energy Boat Challenge, organized by the Yacht Club de Monaco. The event focused on designing innovative zero-emission boats. Elettra also won the Eco Conception prize. Final position: 3rd in Energy Class.

- **Member of Electrical Team** *MEMBC* **Monaco, Principality of Monaco** *2024*

  Second year partecipation with improvements on the power train side, particularry with a home made Battery Energy Storage System. Final position: 3rd in Energy Class.

- **Member of Electrical Team** *Sardinia Innovative Boat Week* **Olbia, Italy** *2024*

  The inaugural Sardinia Innovative Boat Week in Olbia featured advancements in sustainable propulsion and high-tech hull materials. The Unige Elettra Team won the Uniclass category. The event's success paves the way for a 2025 edition, inspired by new UIM sustainable boating regulations. Final position: 1st in Uniclass category.

- **Project Manager & Member of TLC Team** *MEMBC* **Monaco, Principality of Monaco** *2025*

  Third-year participation in this international competition. This year, I am the project manager of the team, with the objective of creating a larger team of students from the University of Genoa.

Teaching

- **Shipboard Power System and Control - ING-IND/33** I did a lecture in November 2024 about the Power Management System on board ships for the Maritime and Science technology students at the University of Genova.

- **Shipboard Electric Propulsion - ING-IND/33** I did a lecture in December 2024 about the Power Management System on board ships for marine engineers and naval architect at the University of Genova.

Projects

During my PhD, I participated in several research projects in collaboration with leading companies in ship design, including Fincantieri and Cetena, as well as the Italian research center for the electric system, RSE. The main projects I was involved in are as follows:

- Coordinated by Cetena S.p.A. and Fincantieri S.p.A., the IPD - Integrated Plant Design project developed tools for onboard ship plant design, focusing on innovative power systems with low or zero emissions.
- In the HTS project, coordinated by Fincantieri S.p.A., applications of superconductive technology on military ships were studied, focusing on system architecture, protection, and control.
- The REFIT project aimed to estimate the State of Health of batteries in Lebanon using SIL and PHIL simulations with the IMPERIX programmable converter.
- The ShIL project focuses on building infrastructure for co-simulations in naval and land contexts.
- The PNRR-funded RAISE project aims to digitalize and automate integrated maritime transport, enhancing environmental and safety impacts.
- The WLSM project, coordinated by Fincantieri S.p.A., studies new techniques for modeling onboard electric loads for Electric Power Load Analysis.
- The Scenarios and tools for electric mobility project, coordinated by RSE S.p.A., aims to optimize the plant layout for high-power charging of electric boats.
- The MOST project, involving 24 universities and companies, focuses on sustainable maritime transport solutions, reducing GHG emissions and improving energy efficiency.
- The MShip project explores superconducting technology in Magnetohydrodynamic propulsion to reduce environmental impact in marine transport.
- The FREMM GRID project develops a benchmark model of the FREMM Shipboard Power System to study Pulse Power Load effects on grid stability and power quality.
- The ARTEM project, coordinated by Fincantieri S.p.A., develops an integrated framework for Model-Based Systems Engineering in Electric Ship design.

Programming & Software Skills

Matlab Programming, Simulink Modelling, GAMS, Latex (Professional); Python, Julia, DigSilent, TRNSYS (Basic knowledge).

Languages

Italian (Native), English (C1), French (A2)

Communication and Interpersonal Skills

- **Public Speaking** I have no issues speaking in public and often encourage people to interact with each other to improve communication within the work environment.
- **Excellent non-verbal language skills** One of the soft skills that I recognize in myself is certainly the ability to interpret and recognize many aspects of non verbal language.
- **Problem Solving** I find it fascinating and stimulating to face new challenges every day aimed at improving the technical level of what is produced. I also consider it important from a managerial perspective to use technology to enhance the performance and efficiency of the work environment in which I am placed.