

Luca Mantelli

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I am currently a research fellow of the Thermochemical Power Group (TPG) of the University of Genoa. Previously I obtained my Ph.D. in Engineering of Machines and Energy Systems, Environment and Transportation at the University of Genoa. My research in systems simulation and controls has been in a variety of applications including fuel cells, turbomachinery, steam generators and combined cycles. I also have international work experience, as a visiting scholar at the National Energy Technology Laboratory in Morgantown, WV, USA and at Mälardalen University in Västerås, Sweden.

Education

NOVEMBER 2017 - MAY 2021

PhD in Mechanical Engineering / University of Genoa / Genoa, Italy

Ph.D. in Engineering of Machines and Energy Systems, Environment and Transportation with Specialization in Mathematical Engineering and Simulation.

Title obtained with honors (lode) and Doctor Europaeus certification.

Thesis: "Performance analysis and dynamics of innovative SOFC hybrid systems based on turbocharger-derived machinery."

JULY 2017

Engineering Licence (Industrial Sector) / University of Genoa - Ordine degli Ingegneri di Genoa / Genoa, Italy

Engineer professional practice examination.

JANUARY 2015 - MARCH 2017

Master's in Mechanical Engineering / University of Genoa / Genoa, Italy

Grade: 110/ 110 and lode, full marks with honors; specialization in Energy and Aeronautics;

Thesis: "Two-Phase Flow Modeling by Using Level Set Methods Coupled with Navier-Stokes Equations."

AUGUST 2011 - DECEMBER 2014

Bachelor's in Mechanical Engineering / Liceo Scientifico e Classico Statale Martin Luther King / Genoa, Italy

Grade: 110/ 110 and lode, full marks with honors;

Thesis: "Feasibility Study of Hydrokinetic Turbine Application in Canals."

SEPTEMBER 2006 - JULY 2011

Scientific Highschool Diploma / University of Genoa, Genoa, Italy

Grade: 100/ 100.

Skills

Concepts Energy Systems • Simulation • Control • Optimization • Uncertainty • Machine Learning

Softwares Matlab/Simulink • Python • Microsoft Office • HUGIN Expert • Latex • Adobe Photoshop

Soft Skills Communication • Teaching • Technical Writing

Languages Italian (Native) • English (Fluent)

Work Experience

FEBRUARY 2023 – PRESENT

Research Fellow (RTD-A) / University of Genoa / Genoa, Italy

- Research activity on sustainable power generation systems for marine applications within the Italian Center for Sustainable Mobility (Centro Nazionale Mobilità Sostenibile - MOST).

NOVEMBER 2020 – JANUARY 2023

Associate Researcher (Assegnista) / University of Genoa / Genoa, Italy

- Experience on European research projects (PumpHeat, SOLARSCO2OL), national projects (PITSTOP) and collaborations with industry (Rolls-Royce Power Systems, Fincantieri).
- Creation of steady-state and dynamic models, as well as control algorithms, for the management and development of novel energy systems, such as fuel cell hybrid systems.
- Simulation of power plants for interfacing with real equipment on cyber-physical systems and in virtual reality environment to assist in training activities.

JULY 2020 – AUGUST 2020

Freelancer / University of Genoa / Genoa, Italy

Development of a communication interface between a real-time model and an experimental SOFC system emulator plant.

JUNE 2019 – SEPTEMBER 2019

Freelancer / University of Genoa / Genoa, Italy

Freelancer activity aimed to design and implement a new simulation and control system for a turbocharger-fuel cell hybrid system emulator.

AUGUST 2018 – DECEMBER 2018

Freelancer / University of Genoa / Genoa, Italy

Design of fuel supply system for gas burners and update of the facility layout diagram.

MAY 2017 – OCTOBER 2017

Post-degree Scholarship / University of Genoa / Genoa, Italy

Post-degree scholarship on the research topic “Coupling of Navier-Stokes Equation and Magnetic Fields for Level Set Front Evolution”.

- Use of level set methods and neural networks for the simulation of magnetic fluids
- Development of control logics to modify the spatial configuration of the magnetic fluid.

International collaborations

SEPTEMBER 2019 – DECEMBER 2019

Visiting Scholar / Mälardalen University / Västerås, Sweden

Research application of Bayesian networks for the diagnosis of components and sensor faults in fuel cell-micro gas turbine hybrid systems with eventual integration with the control system.

OCTOBER 2018 – DECEMBER 2018

Visiting Scholar / National Energy Technology Laboratory / Morgantown, WV, USA

Numerical simulations and experimental testing of compressor surge mitigation methods and recovery in fuel cell hybrid systems.

Teaching and Dissemination Activities

2023 - PRESENT

Lecturer / University of Genoa / Genoa, Italy

Lecturer of the class “Advanced Methods of Monitoring and Design of Systems” with Professors Alberto Traverso and Alessandro Sorce.

2022 - PRESENT

Subject Expert / University of Genoa / Genoa, Italy

Subject expert and member of the exam board of the class “Dynamics and Control of Machines and Energy Systems”.

2020 - PRESENT

Co-supervisor of Theses / University of Genoa / Genoa, Italy

Co-supervisor of 5 Master’s theses and 2 Bachelor’s theses.

2022 – 2023

Seminars / University of Genoa / Genoa, Italy

Seminars for the students of the class “Advanced Methods of Monitoring and Design of Systems” regarding stochastic analyses and simulations, design of experiment, optimization, and robust design. Professors: Alberto Traverso e Alessandro Sorce.

JULY 2022

Invited Speaker / National Energy Technology Laboratory (NETL), United States

Department of Energy (DOE) / Morgantown, West Virginia, USA

Speaker for the seminar “Performance analysis and dynamics of innovative SOFC hybrid systems based on turbocharger-derived machinery”.

2021 – 2022

Seminar / University of Genoa / Genoa, Italy

Seminar “Transfer function estimation and pole placement method for control system design” for the students of the class “Dynamics and Control of Machines and Energy Systems”.

Professor: Alberto Traverso.

DECEMBER 2021

Invited Speaker / Massachusetts Institute of Technology (MIT) / Virtual

Speaker on the topic “Performance analysis and dynamics of innovative SOFC hybrid systems based on turbocharger-derived machinery” during the MIT Gas Turbine Laboratory Symposium on Sustainable Aviation and Power Generation 2021.

DECEMBER 2021

Mentor / Rolls-Royce Doctorate Network / Virtual

Mentor on the topic “Systems Control” during the Skill Exchange session of the Rolls-Royce Doctorate Virtual Conference.

NOVEMBER 2021

Invited Speaker / National Energy Technology Laboratory (NETL), United States

Department of Energy (DOE) / Virtual

Speaker on the topic “Controls for Novel Concepts in the European Projects” during the 6th Low Emission Advanced Power Workshop (LEAP).

2020 – 2021

Seminar / University of Genoa / Genoa, Italy

Seminar “Simulation tools for analysis, design and control of hybrid energy” for the students of the class “Dynamics and Control of Machines and Energy Systems”.

Professor: Alberto Traverso.

2019 – 2020

Seminar / University of Genoa / Genoa, Italy

Seminar “Simulation tools for analysis, design and control of hybrid energy” for the students of the class “Dynamics and Control of Machines and Energy Systems”.

Professor: Alberto Traverso.

2018 – 2019

Teaching Assistant / University of Genoa / Genoa, Italy

Lead exercises for students of engineering geometry class in group.

Professor: Maria Virginia Catalisano.

2018 – 2019

Personal Tutor / University of Genoa / Genoa, Italy

Aid students of engineering geometry class to understand the subject and solve exercises in a one-on-one setting.

Professor: Maria Virginia Catalisano.

Learning Certificates

JUNE 2020

Python for Everybody Specialization / Coursera

Credential ID: TVGVA2J22CK9; Includes: Programming for Everybody; Python Data Structures; Using Python to Access Web Data; Using Databases with Python.

JULY 2019

Machine Learning Crash Course (MLCC) / Massachusetts Institute of Technology (MIT) & University of Genoa

Summer school in collaboration between Massachusetts Institute of Technology and University of Genoa.

JULY 2008

European Computer Driving Licence (ECDL) / ECDL Foundation

European computer driving licence.

Awards

SEPTEMBER 2022

Best Paper Award / ASME

Awarded by the American Society of Mechanical Engineers (ASME) for the best paper of the Cycle Innovations track at Turbo Expo 2022 (*"Gas Turbine Combined Cycle Range Enhancer—Part 2: Performance Demonstration"*).

SEPTEMBER 2022

PhD Thesis Award / AIMSEA

Awarded by the Italian Association of Fluid Machinery, Energy Systems and Power Generation (AIMSEA) for the best PhD thesis of 2021 regarding the academic disciplines of *energy systems and power generation* and *fluid machinery*, during the ATI 2022 conference.

SEPTEMBER 2020

Young Engineer Turbo Expo Participant Award / ASME

Awarded by the American Society of Mechanical Engineers (ASME), during the Turbo Expo 2020.

Affiliations

2017 – PRESENT

TPG Member / University of Genoa / Genoa, Italy

Member of the Thermochemical Power Group (TPG), a research group of the Department of Mechanical, Energy, Management and Transportation Engineering (DIME) of the University of Genoa, focused on the theoretical and experimental study of innovative energy systems.

2017 – PRESENT

Member of the ASME Digital Twin and Cyber-Physical Committee / ASME / USA

Member of the "Digital Twin and Cyber-Physical Committee" of the American Society of Mechanical Engineers (ASME).

2018 – 2021

Student Membership ASME / ASME / USA

Student Member of the American Society of Mechanical Engineers (ASME).

Organization of conferences

2023 – PRESENT

Track Chair ASME POWER/ ASME / Rotterdam, Netherlands

Chair of the track “Digital Twin and Cyberphysical Systems” of the ASME POWER.

2022 – PRESENT

Member of the SUPEHR 2023 Organizing Committee / University of Genoa / Savona, Italy

“SUstainable PolyEnergy generation and HaRvesting (SUPEHR) 2023” conference.

2021 – 2022

Co-Organizer ASME Turbo Expo 2022/ ASME / Rotterdam, Netherlands

Support on the management of the peer-review process for the articles of the session “microGT Dynamic Simulations” of the ASME Turbo Expo 2022.

Scientific publications

11 FEBRUARY 2025

SCOPUS Metrics

- Publications 43
- Citations 189
- H-index 7