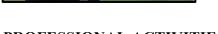# Paolo Roberto Massenio, PhD

DoB: 09/01/1992

Department of Electrical and Information Engineering
Polytechnic University of Bari
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PROFESSIONAL ACTIVITIES

Polytechnic University of Bari, Bari, Italy

08/2022 – Today | *Assistant Professor*. Research interests include distributed control, reinforcement learning-based control algorithms, control of novel and unconventional actuators based on dielectric elastomers, control of soft robots, and parameter estimation techniques for electrical machines.

01/2023 – Today | *Scientific Coordinator*. Scientific coordination on behalf of the Polytechnic University of Bari on EU funded projects: 1) AMBER (supported by the EU Clean Aviation program); 2) NEUMANN (supported by the European Defense Fund). Total grant amount ~500k€

02/2021 – Today | *Adjunct Professor* of "Fundamentals of Control Systems Engineering" within the Bachelor Course in Aerospace Systems Engineering

07/2021 – 07/2022 | *Post-doc Research Fellow*.

02/2021 – 12/2022 | *Technical Coordinator*. Coordination and development of the technical activities within the collaboration between Polytechnic University of Bari and TESMEC RAIL company. Project goals are focused on the development of safe and efficient control systems for electrified railway construction/diagnosis vehicles.

Cyber Dyne S.R.L., Bari, Italy

09/2016 – 05/2017 | *Algorithm Development Engineer*. Design and development of JAVA algorithms for advanced AI-based platforms aimed at optimally planning and allocating corporate resources of different customers.

EDUCATION

Polytechnic University of Bari, Bari, Italy

11/2017 – 12/2020 | Doctor of Philosophy in Electrical and Information Engineering. Thesis: "*Reinforcement Learning-Based Techniques for the Optimal Control of Complex Systems*".

10/2014 – 02/2017 | Master's Degree in Automation Engineering (cum laude). Thesis: "*Fault Detection Algorithms for Electrical Machines in Aeronautic Applications*".

10/2010 – 06/2014 | Bachelor's Degree in Information Science and Automation Engineering. Thesis: "*Modeling, Simulation, and Performance Evaluation of Intermodal Transportation Systems*".

ABROAD RESERACH

The University of Texas at Arlington, Arlington, TX, USA

06/2019 – 07/2020 | *Visiting Scholar* at the Complex Power Electronic Systems Laboratory. Tutors: Prof. A. Davoudi and Prof. F. L. Lewis. Research and developments of advanced reinforcement learning techniques for the distributed control of DC microgrids. Testing activities conducted on HIL test benches with DSpace, Typhoon HIL, and OPAL-RT technologies.

PUBLICATIONS

Journals

1. <u>P.R. Massenio</u>, G. Rizzello, G. Comitangelo, D. Naso, S. Seelecke, "Reinforcement Learning-Based Energy Minimum Position Control of Dielectric Elastomer Actuators", *IEEE Transactions on Control System Technologies*, Sep 2020.
2. <u>P.R. Massenio</u>, D. Naso, F. L. Lewis, A. Davoudi, "Assistive Power Buffer Control via Adaptive Dynamic Programming", *IEEE Transactions on Energy Conversion*, mar 2020. **Best Paper Award for the year 2019-2020 in the energy-storage area**.
3. <u>P.R. Massenio</u>, D. Naso, F. L. Lewis, A. Davoudi, "Data-driven Sparsity-promoting Optimal Control of Power Buffers in DC Microgrids", *IEEE Transactions on Energy Conversion*, 2020. **Best Paper Award for the year 2020-2021 in the energy-storage area**.
4. E. Brescia, D. Costantino, <u>P.R. Massenio</u>, V.G. Monopoli, F. Cupertino, G.L. Cascella, "A Design Method for the Cogging Torque Minimization of Permanent Magnet Machines with a Segmented Stator Core Based on ANN Surrogate Models", *Energies, vol 14,* 2021.
5. E. Brescia, D Costantino, F. Marzo, <u>P.R. Massenio</u>, G.L. Cascella, D. Naso, "Automated Multistep Parameter Identification of SPMSMs in Large-Scale Applications Using Cloud Computing Resources", *Sensors, vol 14,* 2021.
6. M. Tipaldi, R. Iervolino, <u>P. R. Massenio</u>, "Reinforcement learning in spacecraft control applications: Advances, prospects, and challenges", *Annual Reviews in Control*, 2022.
7. E. Brescia, M. Palmieri, <u>P. R. Massenio</u>, G. L. Cascella and F. Cupertino, "Cogging Torque Suppression of Modular Permanent Magnet Machines Using a Semi-Analytical Approach and Artificial Intelligence," *IEEE Access*, 2023.
8. P. R. Massenio, M. Tipaldi, G. Rizzello, E. Brescia, G. L. Cascella, and D. Naso, "Gain-Scheduled Structured Control in DC Microgrids", *IEEE Transactions on Control Systems Technology*, 2023.
9. C. Perri, B. Holz, P. R. Massenio, D. Naso, and G. Rizzello, "Design, Modeling, and Experimental Validation of a High Voltage Dribing Circuit for Dielectric Elastomer Actuators", *IEEE Transactions on Industrial Electronics*, 2023.
10. E. Brescia, P. R. Massenio, M. Di Nardo, G. L. Cascella, C. Gerada, and F. Cupertino, "Nonintrusive Parameter Identification of IoT-Embedded Isotropic PMSM Drives", *IEEE Journal of Emerging and Selected Topics in Power Electronics*, 2023.

11. E. Brescia, P. R. Massenio, M. Di Nardo, G. L. Cascella, C. Gerada, and F. Cupertino, "Parameter Estimation of Isotropic PMSMs Based on Multiple Steady-State Measurements Collected During Regular Operations", *IEEE Transactions on Energy Conversion*, 2023.

Conference proceedings

1. P.R. Massenio, G. Rizzello, D. Naso, F. Lewis, A. Davoudi, "Data-Driven Optimal Structured Control for Unknown Symmetric Systems", *IEEE International Conference on Automation Science and Engineering*, August 2020, Hong Kong.
2. P.R. Massenio, G. Rizzello, D. Naso, "Energy Optimal Control of Dielectric Elastomer Actuators via Adaptive Dynamic Programming", *IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications*, August 2019, Anaheim, CA.
3. P.R. Massenio, G. Rizzello, D. Naso, "Fuzzy Adaptive Dynamic Programming Minimum Energy Control Of Dielectric Elastomer Actuators", *IEEE International Conference on Fuzzy Systems*, June 2019, New Orleans, LA.
4. D. Costantino, E. Brescia, P.R. Massenio, P. Serafino, G.L. Cascella, F. Cupertino, "SuMRAS: a new SPMSM Parameter Identification in Cloud Computing Environment", *IEEE Workshop on Electrical Machines Design, Control and Diagnosis*, April 2021, Modena, Italy.
5. P. R. Massenio, J. Prechtl, D. Naso, G. Rizzello, "Nonlinear optimal control of a soft robotic structure actuated by dielectric elastomer artificial muscles", *IEEE/ASME International Conference on Advanced Intelligent Mechatronics* (AIM), 2022.
6. P. R. Massenio, G. Rizzello, O. Pohudina, R. Bartolo, and D. Naso, "Mixed H_∞/H_2 Control of a Soft Robotic Structure Actuated by Dielectric Elastomers", *IEEE Industrial Electronics Society 1st Annual On-Line Conference* (ONCON), 2022.
7. G. Soleti, J. Prechtl, P. R. Massenio, M. Baltes, and G. Rizzello, "Energy Based Control of a Bi-Stable and Underactuated Soft Robotic System Based on Dielectric Elastomer Actuators", *22th IFAC World Congress*, 2023.
8. P. R. Massenio, G. Rizzello, M. Tipaldi, and D. Naso, "Gain-Scheduled Control of LPV Systems with Structural Constraints", *22th IFAC World Congress*, 2023.

SKILLS

Programming languages: JAVA, Python, C/C++.

Development tools: MATLAB, SIMULINK, ControlDesk, Veristand, Typhoon HIL.

LANGUAGES

Italian – Mother tongue.

Inglese – Fluent.