Stefano Nuzzo, PhD

SHORT BIOGRAPHY

Stefano Nuzzo (S'17-M'18-SM'23) received the B.Sc. and M.Sc. degrees in Electrical Engineering from the University of Pisa, Pisa, Italy, in 2011 and 2014, respectively. He received his Ph.D. degree in Electrical and Electronic Engineering in 2018 from the University of Nottingham, Nottingham, U.K, where he worked also as a Research Fellow within the Power Electronics, Machines and Control (PEMC) Group. In January 2019, he moved to Modena, Italy, where he is currently a Tenure Track Assistant Professor in Electric Machines and Drives at the Department of Engineering "Enzo Ferrari" of the University of Modena and Reggio Emilia.

His research interests are the analysis, modelling and optimization of electrical machines and drives, with focus on sustainability and reliability design approaches of synchronous drives based on radial flux machines for industrial and traction applications.

He was recently involved in projects related to the more electric aircraft initiative, including two H2020 Clean Sky projects "Reliable Aircraft electrical Insulation System sElection" (RAISE) and "Automated Manufacturing of wound components for next generation Electrical machines" (AUTO-MEA), where he was the leader of two technical work packages. He is also involved in a number of projects funded by the climate, energy and mobility programme of the EU, such as "Switching-Cell-Array-based Power Electronics conversion for future electric vehicles (SCAPE)". Currently, he is the representative for the University of Modena and Reggio Emilia of the Technical Committee of the MSC H2020 RISE project "Development of High Reliability motor drives for Next generation propulsion Applications (DORNA)". Additionally, within the Department of Engineering "Enzo Ferrari", Stefano covers the roles of Secretary for the Research Committee and President of the Internationalization Committee for the PhD course in Information & Communication Technologies.

Stefano Nuzzo is a Senior Member of the IEEE, a Member of the IEEE Young Professionals, the IEEE Industrial Electronics Society (IES), the IEEE Industry Applications Society (IAS), and the IEEE Power Electronics Society (PELS). He constantly serves the scientific community as a reviewer for several IEEE and MDPI journals and conferences, and he is currently an Associate Editor for the IEEE PELS Transactions on Transportation Electrification and IEEE PES Transactions on Energy Conversion.

He has co-organized the 2021 IEEE Workshop on Electrical Machine Design, Control and Diagnosis (WEMDCD) and he is the General Chair of the upcoming 2025 edition of the same workshop, which will be held at the University of Malta.

Stefano is author or co-author of more than 80 scientific publications which, according to Scopus, have today achieved more than 1150 citations with an H-index equal to 19 (July 2024). He has obtained the National Academic Qualification as Associate Professor in February 2022 and as Full Professor in December 2023.

EDUCATION

Apr. 2014 - 2018: PhD in Electrical Machines
Power Electronics, Machines and Control Group, Faculty of Engineering, University of Nottingham, UK
Thesis title**:** "On the Damper Cage of Salient-Pole Synchronous Generators"
Application: Diesel-Engine Driven Synchronous Generators, mainly used for standalone applications – collaboration with Cummins Generator Technologies (CGT)

Sep. 2011 – Apr. 2014: MSc in Electrical Engineering
Department of Energy, Systems, Territory and Construction Engineering, University of Pisa, Italy

Sep. 2006 – Mar. 2011: BSc in Electrical Engineering
Department of Electrical Systems and Automation, University of Pisa, Italy

PROFESSIONAL EXPERIENCE

Aug. 2022 – date: Assistant Professor at University of Modena and Reggio Emilia, Italy

Jan 2019 – Sep. 2022: Research Fellow at University of Modena and Reggio Emilia, Italy

May 2018 – Aug. 2018: Visiting Fellow at University of Pisa, Italy

Oct. 2017- Sep. 2020: Research Fellow at University of Nottingham, Nottingham, UK

Apr. 2014 - Jan. 2018: PhD Student at University of Nottingham, Nottingham, UK

Aug. 2016 – Oct. 2016: Visiting PhD at University of Pisa, Italy

Jul. 2015 – Dec. 2015: PhD Placement at Cummins Generator Technologies Stamford, UK

AREAS OF INTEREST AND EXPERTISE

- Electrical Machines and Drives
  - Analysis, modelling and simulation
  - Multi-physics optimisations
  - Reliability-oriented design of electric drives
    - Multi-phase windings
    - Effects of fast switching power electronics devices on insulation systems of electrical machines
    - High-frequency modelling of converters-cable-motors systems
  - Sustainability-oriented design of electrical machines
    - Use and research of advanced sustainable materials for machine windings and cores
    - Design, modelling and optimisation rare-earth permanent magnet free electrical machines, e.g. electrically-excited machines for industrial and transport applications

PUBLICATIONS

Google scholar profile: https://scholar.google.com/citations?user=2DbNT6MAAAAJ&hl=it&oi=ao

RESEARCH MANAGEMENT

- Leader of 2 Work Packages for H2020 Clean Sky 2 project "**AUTO-MEA**" (**AUTO**mated **M**anufacturing of wound components for next generation **E**lectrical m**A**chines)
- Representative for the University of Modena of the Technical Committee of the MSCA-RISE - Marie Skłodowska-Curie Research and Innovation Staff Exchange (RISE) project DORNA - Development of high reliability motor drives for next generation propulsion applications
- Tutor or co-tutor of 5 PhD students at the University of Modena and Reggio Emilia (current).
- Co-tutor of 2 PhD students at the University of Nottingham (past).

TEACHING ACTIVITIES

- Motorvehicle University of Emilia Romagna - "Electric Propulsion Systems" for 1st year MSc students in Advanced Automotive Engineering (current)
- University of Modena and Reggio Emilia - "Electric Drives" for 2nd year MSc students in Vehicle Engineering (current)
- University of Modena and Reggio Emilia - "High Performance Electric Drives and Laboratory" for 2nd year MSc students in Electronics Engineering (past)
- University of Modena and Reggio Emilia - "Advanced Electrical Machines for Green Transportation" for 2nd year MSc students in Vehicle Engineering (past)
- Free University of Bozen, "Industrial Automation and Mechatronics/Electric drives and machines" for 1st year MSc students in Mechanical and Logistic Engineering (current)
- Free University of Bozen, "Electric and hybrid mobility/Electric powertrains and batteries" for 1st year MSc students in Energy Engineering (past)

EDITORIAL ACTIVITIES

- Associate Editor for the IEEE PES Transactions on Energy Conversion
- Associate Editor for the IEEE PELS Transactions on Transportation Electrification
- General Chair for the upcoming 2025 IEEE Workshop on Electrical Machine Design, Control and Diagnosis (WEMDCD), 9-10 April 2025, Valletta, Malta.
- Member of the Award Committee at the 2023 IEEE Workshop on Electrical Machine Design, Control and Diagnosis (WEMDCD), 13-14 April 2023, Newcastle, UK.
- Technical program co-chair for the "Machine design and modelling" track at the 2021 IEEE Workshop on Electrical Machine Design, Control and Diagnosis (WEMDCD), 8-9 April 2021, Modena, Italy.
- Topic Editor of MDPI Electronics journal
- Technical committee member as a special session chair for the special session "Sustainable Electric Drives for E-Mobility" at the upcoming ICEM 2024.
- Technical committee member as a special session chair for the special session "Off-highway vehicle electrification: electric and hybrid powertrains components" at the upcoming ICEM 2024.
- Technical committee member as a special session chair for the special session "Hairpin Windings in Electrical Machines for Transportation" at ICEM 2022.
- Technical committee member as a special session chair for the special session "Ultra-Reliable Power Conversion for More Electric Transports" at IECON 2019.
- Reviewer board member of MDPI Applied Science journal.
- Reviewer for IEEE and MDPI conferences and journals.

EDITORIAL AWARDS

- Outstanding Associate Editor of IEEE Transactions on Transportation Electrification (TTE) in 2023.
- Star Reviewer of IEEE Transactions on Energy Conversion in 2021
- Star Reviewer of IEEE Transactions on Energy Conversion in 2020
- Outstanding Reviewer award at the 2020 IEEE International Conference on Electrical Machines (ICEM), 23rd-26th April 2021, Gothenburg, Sweden.

PAPER AWARDS

- Co-author of the paper "Optimal Sizing of Hairpin Conductors in highway operation with PWM power supply", awarded the best student paper at the 2023 IEEE Workshop on Electrical Machine Design, Control and Diagnosis (WEMDCD)
- Co-author of the paper "Refined Structural Design and Thermal Analyses of a High-Speed Wound-Field Generator for the More Electrical Aircraft", awarded the best student paper at the 2023 IEEE Workshop on Electrical Machine Design, Control and Diagnosis (WEMDCD).
- First author of the paper "Hairpin Windings: An Opportunity for Next-Generation E-Motors in Transportation,", awarded the Featured Article of the IEEE Industrial Electronics Magazine in December 2022.
- Co-author of the paper "Investigation of Resistivity Impact on AC Losses in Hairpin Conductors", presented at the 47th Annual Conference of the IEEE Industrial Electronics Society (IECON 2021), awarded the Second prize paper award of the IEEE IES Electrical Machines Technical Committee (EMTC) of the Industrial Electronic Society (IES).
- Co-author of the paper "Improved Propulsion Motor Design for a Twelve Passenger All-Electric Aircraft", awarded the best student paper at the 2021 IEEE Workshop on Electrical Machine Design, Control and Diagnosis (WEMDCD)
- Co-author of the paper "Multi Three-Phase Hairpin Windings for Electrical Machine High Speed Application: Possible Implementations", awarded the best student paper at the 2021 IEEE Workshop on Electrical Machine Design, Control and Diagnosis (WEMDCD).

PATENTS

Owner as Inventor of the Chinese Patent CN112865376A (Application number CN202110020702.6), deposited by the University of Nottingham Ningbo, Ningbo, China, entitled "INTEGRAL DAMPING WINDING, ROTOR AND MOTOR".