

SCIENTIFIC CURRICULUM VITAE

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February 2021

Alberto Tenconi received the M. Sc. in 1986 and the PhD. in 1990, both in Electrical Engineering from the Politecnico di Torino, Italy.

From 1988 to 1993, he worked for the Electronic System Division of FIAT Research Center, where he was engaged in the development of electrical vehicle drive systems. He then joined the Department of Electrical Engineering at Politecnico di Torino where, from the year 2006, he is Full Professor (disciplinary science sector: ING-IND/32, Power electronic converters, electrical machines and drives). He has been Head of the Department of Energy, Politecnico di Torino, for the mandate 2015-2019.

His fields of interest are unconventional radial and axial flux electric machines, high performance drives and power electronic converters for energy conditioning. In particular, his experience concerning the electrification transportation includes both the theoretical and the experimental aspect involved by the design, modeling and development of **three-phase and multi-phase electric drives for vehicles and aircraft applications**

Publication Activity

The research activity is documented by more than **60 International Journal papers** and more than **170 papers published on International Conference Records** (source Cineca). The scientific production is **co-authored by more than 120 international researchers** (source Scopus) showing the cooperation with national and international research groups. The main **bibliometric indexes** are:

- Scopus (180 documents): **h-index 34, citations 4047 (self citations excluded)**;
- Google Scholar (224 documents): h-index 39, citations 6199, i10-index 106.

In 1997 Alberto Tenconi received the Second Prize Paper Award from the Power Electronics Devices and Components Committee of the IEEE-Industry Applications Society and in 2005 he received the First Prize Paper Award from IEEJ-IPEC'05, Nigata, Japan and in 2015 the Third Prize Paper Award as published in the IEEE Transactions on Industry Applications.

Research and Technology Transfer Activity: Contracts and Grants

Alberto Tenconi has participated at many Regional, National and European Research Programmes on competitive basis; he has also worked in several research contracts committed by industrial companies. Among the most important and relevant projects where Alberto Tenconi has performed his duties as responsible:

- FCA GROUP (2019-2021), Progetti Ricerca&Tesi "e-Drive components modelling for ePT system virtual validation" and "e-Motor and Inverter simplified energetic modeling for ePT system virtual validation": Deputy Leader.
- REGIONE PIEMONTE (2018-2019), "E-drive test new infrastructure for automotive and aerospace applications": Principal Investigator.

- MIUR – National Technological Cluster - Aerospace (2014-2017), "TIVANO Innovative Technologies for Aircraft (Tecnologie Innovative per Velivoli di Aviazione generale di Nuova generaziOne)": WP leader Electrification of the propulsion systems.
- Ministry of Economic Development – ENEA – RSE (2013-2015), "V2G: energetic aspects of the power interface and impact on the storage system": Responsible of the research unit of Politecnico di Torino.
- Aeronautical Service (2015), "Magnetic and energetic evaluations of SMC magnetic core in AC machines for aeronautical applications": Scientific Responsible of the contract.
- European Union - 7FP (2011-2014), "SESAME: Securing the European Electricity Supply Against Malicious and accidental thrEats": Steering Committee Member.
- European Union - ENIAC JU (2011-2013), "MOTORBRAIN: Nanoelectronics for Electric Vehicle Intelligent Failsafe PowerTrain": Responsible of the research unit of Department of Electrical Engineering.
- MIUR - PRIN 2009 (2011-2013), "Azionamenti Elettrici Multifase ad Elevata Affidabilità per Applicazioni More Electric Aircraft": Principal Investigator.
- REGIONE PIEMONTE (2010-2013), "HyTC: Motopropulsore a Trasmissione Ibrida Innovativa per City Cars": Responsabile of the research unit of Politecnico di Torino.
- REGIONE PIEMONTE (2009-2011), "GREAT 2020: Green Engine for Air Transport in 2020": Responsible of the research unit of Department of Electrical Engineering.
- REGIONE PIEMONTE (2007-2009), "VUMES: Multi-Eco Solar Urban Vehicle": Principal Investigator.
- MAGNETI MARELLI (2007-2009), "Motor-generator for hybrid powertrains": Responsible of the contract.
- REGIONE PIEMONTE (2006-2009), "Development of electrically propelled micro/mini *unmanned aerial vehicle* with micro-fuel cells generation systems" Responsible of the research unit of Department of Electrical Engineering.
- GENERAL MOTORS – POWERTRAIN EUROPE (2006-2008), "Concept development, energy analysis and preliminary design of an e-AWD hybrid solution for European market": Responsible of the contract.
- TORINO WIRELESS (2007-2008), "High efficiency DC/AC Converter dedicated to an Electrical Booster Demonstrator": Scientific Responsible of the contract.
- TORINO WIRELESS (2006-2007), "Study and implementation of power converters and modulation techniques for electric/hybrid traction systems": Responsible of the contract.
- REGIONE PIEMONTE (2006-2008), "Promotion and development of the Piedmont industry in the field of components for fuel cells propulsion systems - FC Auto": Responsible of the research unit of Politecnico di Torino.
- REGIONE PIEMONTE (2006-2008), "Support at the development of the hydrogen technologies in Piedmont – HysyVision": Responsible of the research unit of Politecnico di Torino.
- ANSALDO RICERCHE (1999-2001), "Study and realization of DSP based digital control systems": Responsible of the contract.
- CENTRO RICERCHE FIAT (1999-2001), "Study and realization of multi-phase induction motor drives for automotive applications": Responsible of the contract.
- CENTRO RICERCHE FIAT (1997), "Design and realization of induction machine rotor-stator units for automotive applications": Responsible of the contract.
- A.R.I.S. (1995), "Prototype development of small electric car": Responsible of the contract.
- CENTRO RICERCHE FIAT – BMW - PILLER (1995-1996), "Induction motor optimised for electric vehicle traction systems", in the frame of the research project "Research and Evaluation of Innovative Technologies for High Efficiency, High Performance Drive Systems for the Application in Electric and Hybrid Vehicles (RITA)" UE JOULE II: Responsible of the research unit of Politecnico di Torino.

Service Activity

Alberto Tenconi is IEEE Senior Member and Professional Member of the Italian chapter of IEEE-Eta Kappa Nu (HKN) honor society. He is reviewers for International Journals (IEEE Transactions on Industry Applications, IEEE Transactions on Industrial Electronics, IEEE Transactions on Power Electronics, IEE Proceedings – Electric Power Applications, EPE Journal, etc.), and International Conferences in the field of interest. From 2009 to 2011 he served as **Associate Editor** for the IEEE Transactions on Industrial Electronics where he has also served as Guest Editor.

Alberto Tenconi is member of the steering committee of the following **National Interuniversity Consortiums**:

EL.MO. “ELettrificazione della MObilità”.

EnSiEL “Energia, Sistemi e impianti ELettrici”.

He is member of the **Thematic Committee for Institutional Research in MUR – National Technological Cluster – Energy**.

He has served as **expert for the evaluation of the academic research quality (VQR 2004-2010)** or the national agency for the evaluation of universities and research institutes.

He worked as scientific **expert in the evaluation of research and development programs** for MUR and other academic institutions.

Furthermore, he is member of the **qualification committee for the MUR - National Scientific Qualification (ASN)**.

Alberto Tenconi is member of the board of the Doctorate in Electrical, Electronics and Communications Engineering of Politecnico di Torino and the board of the Technological Curriculum of the National Ph.D. School in Sustainable Development and Climate Change.

He has been member of the following boards in Politecnico di Torino:

- Academic Senate of Politecnico di Torino;
- Research and Technology Transfer Committee;
- Selection Committee of the Siebel Energy Institute “seed projects” award.

Alberto Tenconi has been President of the Italian Association CMAEL (Power Converters, Electric Machines and Drives) from 2014 to 2017.

Teaching and Public Engagement Activity

The teaching activity of Alberto Tenconi at Bachelor and Master level has covered the courses of “Electric Machines”, “Electric Drives”, “Industrial Power Electronics” and “Electrical propulsion for transport systems”; he has supervised more than 150 thesis of students from 1996 up to today. He has tutored more than 15 Ph.D. students.

Alberto Tenconi has organized/participated several public engagement events. To mention the two most recent events: 10/11/2019 Festival della Tecnologia “Rivoluzione Auto Elettrica”, 17/9/2020 @VTM, Vehicle & Transportation Technology Innovation Meetings “Batteries for electrified road vehicles: trends, challenges and opportunities”.

20 selected papers: recent and/or concerning the transportation electrification

Journal Papers

- [1] Vaschetto, Silvio, Cavagnino, Andrea, Agamloh, Emmanuel B., Tenconi, Alberto (2021). Enhanced Stray-Load Loss Measurements Through a Zig-Zag Variable Load Test Approach. *IEEE TRANSACTIONS ON INDUSTRY APPLICATIONS*, p. 226-235, ISSN: 0093-9994, doi: 10.1109/TIA.2020.3029757.
- [2] Giordano, Francesco, Ciocia, Alessandro, Di Leo, Paolo, Mazza, Andrea, Spertino Filippo, Tenconi Alberto, Vaschetto Silvio, (2020). Vehicle-to-Home Usage Scenarios for Self-Consumption Improvement of a Residential Prosumer With Photovoltaic Roof. *IEEE TRANSACTIONS ON INDUSTRY APPLICATIONS*, 2945-2956, ISSN: 0093-9994, doi: 10.1109/TIA.2020.2978047.
- [3] Sandro Rubino, Radu Bojoi, Eric Armando, Alberto Tenconi (2020). Deadbeat Direct Flux Vector Control of Surface Permanent Magnet Motor Drives. *IEEE TRANSACTIONS ON INDUSTRY APPLICATIONS*, vol. 56, p. 2685-2699, ISSN: 0093-9994, doi: 10.1109/TIA.2020.2972835.
- [4] Krings, Andreas, Cossale, Marco, Tenconi, Alberto, Soulard, Juliette, Cavagnino, Andrea, Boglietti, Aldo (2017). Magnetic materials used in electrical machines: A comparison and selection guide for early machine design. *IEEE INDUSTRY APPLICATIONS MAGAZINE*, vol. 23, p. 21-28, ISSN: 1077-2618, doi: 10.1109/MIAS.2016.2600721.
- [5] Odhano, Shafiq, Bojoi, Radu, Formentini, Andrea, Zanchetta, Pericle, Tenconi, Alberto (2017). Direct flux and current vector control for induction motor drives using model predictive control theory. *IET ELECTRIC POWER APPLICATIONS*, vol. 11, p. 1483-1491, ISSN: 1751-8660, doi: 10.1049/iet-epa.2016.0872.
- [6] Bojoi, Radu, Cavagnino, Andrea, COSSALE, MARCO, Tenconi, Alberto (2016). Multiphase starter generator for 48V mini-hybrid powertrain: Design and testing. *IEEE TRANSACTIONS ON INDUSTRY APPLICATIONS*, vol. 2015, p. 1750-1758, ISSN: 0093-9994, doi: 10.1109/TIA.2015.2487351.
- [7] Bojoi, Radu, Cavagnino, Andrea, Tenconi, Alberto, Vaschetto, Silvio (2016). Control of Shaft-Line-Embedded Multiphase Starter/Generator for Aero-Engine. *IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS*, vol. 1, p. 641-652, ISSN: 0278-0046, doi: 10.1109/TIE.2015.2472637.
- [8] Cavagnino, Andrea, Tenconi, Alberto, Vaschetto, Silvio (2016). Experimental characterization of a belt-driven multi-phase induction machine for 48 V automotive applications: Losses and temperatures assessments. *IEEE TRANSACTIONS ON INDUSTRY APPLICATIONS*, vol. 2015, p. 1321-1330, ISSN: 0093-9994, doi: 10.1109/TIA.2015.2487456.
- [9] Cavagnino, Andrea, Li, Zijian, Tenconi, Alberto, Vaschetto, Silvio (2013). Integrated Generator for More Electric Engine: Design and Testing of a Scaled-Size Prototype. *IEEE TRANSACTIONS ON INDUSTRY APPLICATIONS*, vol. 49, p. 2034-2043, ISSN: 0093-9994, doi: 10.1109/TIA.2013.2259785.
- [10] Tenconi, Alberto, Vaschetto, Silvio, Vigliani, Alessandro (2013). Electrical Machines for High-Speed Applications: Design Considerations and Trade-offs. *IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS*, p. 3022-3029, ISSN: 0278-0046, doi: 10.1109/TIE.2013.2276769.
- [11] Boglietti, Aldo, Bojoi, Radu, Cavagnino, Andrea, Tenconi, Alberto (2008). Efficiency Analysis of PWM Inverter Fed Three-Phase and Dual Three-Phase High Frequency Induction Machines for Low/Medium Power Applications. *IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS*, vol. 55, p. 2015-2023, ISSN: 0278-0046, doi: 10.1109/TIE.2008.918489.
- [12] Bojoi, Radu, Farina, Francesco, Griva, Giovanni Battista, Profumo, Francesco, Tenconi, Alberto (2005). Direct torque control for dual three-phase induction motor drives. *IEEE TRANSACTIONS ON INDUSTRY APPLICATIONS*, vol. 41, p. 1627-1636, ISSN: 0093-9994, doi: 10.1109/TIA.2005.858281.

Conference Papers

- [13] Vaschetto S., Ahmadi Darmani M., Cavagnino A., Tenconi A. (2019). Nanofluids for Rotating Electrical Machines Cooling: Perspectives and Challenges. In: 2019 21st European Conference on Power Electronics and Applications, EPE 2019 ECCE Europe. Piscataway, New Jersey: Institute of Electrical and Electronics Engineers Inc., ISBN: 978-9-0758-1531-3, Genova (ITA), 3-5 Sept. 2019, doi: 10.23919/EPE.2019.8915554.
- [14] Bojoi, Radu, Boggero, Luca, Corpino, Sabrina, Fioriti, Marco, Tenconi, Alberto, Vaschetto, Silvio (2018). Multiphase Drives for Hybrid-Electric Propulsion in Light Aircrafts: A Viable Solution. In: SPEEDAM 2018 - Proceedings: International Symposium on Power Electronics, Electrical Drives, Automation and Motion. p. 613-619, Institute of Electrical and Electronics Engineers Inc., ISBN: 9781538649411, ita, 2018, doi: 10.1109/SPEEDAM.2018.8445241.
- [15] Tenconi A., Rubino S., Bojoi R. (2018). Model Predictive Control for Multiphase Motor Drives - A Technology Status Review. In: 2018 International Power Electronics Conference, IPEC-Niigata - ECCE Asia 2018. p. 732-739, Institute of Electrical and Electronics Engineers Inc., ISBN: 978-4-88686-405-5, Toki Messe Niigata Convention Center, jpn, 2018, doi: 10.23919/IPEC.2018.8507960.
- [16] Bojoi, Radu, Rubino, Sandro, Tenconi, Alberto, Vaschetto, Silvio (2016). Multiphase Electrical Machines and Drives: A Viable Solution for Energy Generation and Transportation Electrification. In: Proceedings of the 2016 International Conference and Exposition on Electrical and Power Engineering, EPE 2016. p. 632-639, ISBN: 9781509061297, Iasi, ROMANIA, October 20-22, 2016, doi: 10.1109/ICEPE.2016.7781416.
- [17] Bojoi, Radu, Cavagnino, Andrea, Odano, Shafiq, Ahmed, Tenconi, Alberto, Vaschetto, Silvio (2015). Experimental fault assessment on multiphase PM generators with fractional-slot concentrated windings. In: IECON 2015 - 41st Annual Conference of the IEEE Industrial Electronics Society. p. 4941-4947, IEEE, Yokohama, Japan, 9-12 November 2015, doi: 10.1109/IECON.2015.7392875.
- [18] Bojoi, Radu, Cavagnino, Andrea, Tenconi, Alberto, Tassarolo, Alberto, Vaschetto, Silvio (2015). Multiphase Electrical Machines and Drives in the Transportation Electrification. In: 2015 IEEE 1st International Forum on Research and Technologies for Society and Industry Leveraging a better tomorrow (RTSI). p. 205-212, ISBN: 978-1-4673-8166-6, Turin, 16-18 Sept. 2015, doi: 10.1109/RTSI.2015.7325099.
- [19] Mariut, Felix, Rosu Stefan-George, Bojoi Radu, Tenconi, Alberto (2015). Multiphase modular power converter using the PEBB concept and FPGA-based direct high speed voltage measurement. In: 2015 17th European Conference on Power Electronics and Applications, EPE-ECCE Europe 2015. p. 1-10, Institute of Electrical and Electronics Engineers Inc., ISBN: 9789075815221, Ginevra, 2015, doi: 10.1109/EPE.2015.7309332.
- [20] Boglietti, Aldo, Cavagnino, Andrea, Tenconi, Alberto, Vaschetto, Silvio (2009). The Safety Critical Electrical Machines and Drives in the More Electric Aircraft: a Survey. In: Conference Record of IEEE-IECON 2009. p. 2607-2614, ISBN: 9781424446483, Porto - Portogallo, 3-5 November 2009, doi: 10.1109/IECON.2009.5415238.