Lorenzo Bartolucci

Curriculum Vitae of Lorenzo Bartolucci

The future belongs to those who believe in the beauty of their dreams.

1 CONTACTS

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Born at Rome (Italy) on 31/10/1989

2 EDUCATION

2.1 PhD and Degrees

2016 PhD in Industrial Engineering – Energy and Environment, at University of Rome Tor Vergata – Dissertation Title: "*Numerical Simulation Of The Injection And Combustion Processes Of Lean Natural Gas Fueled Internal Combustion Engines"*

2013 Master Degree in Energy Engineering – University of Rome Tor Vergata – 110/110 with honor. Thesis Title: "*Simulation of the combustion process of partially stratified gaseous fuel-air mixtures in a constant volume combustion chamber"*

2011 Bachelor Degree in Energy Engineering – University of Rome Tor Vergata – 110/110 with honor. Thesis Title: "*Recupero di Energia Cinetica da moto ondoso su natanti a vela per la produzione di Energia Elettrica"*

2.2 High formation courses

September 2014 - MSc/PhD course in CFD with OpenSource software, *Chalmers University of Technology*, Goteborg.

2.3 Awards

Winning of Enertour4UniversityStudents 2013 contest, with the project *"Smart è sostenibile"*.

3 TEACHING ACTIVITIES

3.1 Bachelor Degree's courses

→ Practical lessons for the Machinery class since 2014

3.2 Master Degree's courses

→ 2CFU of System and Component for Renewable Energy Conversion course A.Y. 2017/2018 for Energy and Mechanical Engineering Degrees.

→ 2CFU of Internal Combustion Engines course since 2018 to present for Energy and Mechanical Engineering Degrees.

3.3 PhD courses and seminars

→ ***March 2020*** – PhD Course "How to report and Design your experiments" in the Industrial Engineering PhD at University of Rome Tor Vergata

→ ***July 2018*** – Seminary on biogas production and hybrid power systems in the Summer School "Sustainable Development Labs 2018".

→ ***April 2018*** - Seminary at Argonne National Laboratory, Chicago, USA "*Natural Gas fueling for Internal Combustion Engines"*.

→ ***March 2018*** - Seminars of 8 hours at Labor research center of Rome "*Hydrogen for High Efficiency Internal Combustion Engine"*.

3.4 Supervising

Supervisor and Co-Supervisor of more than 30 Master Degree Students in Mechanical and Energy Engineering.

4 RESEARCH EXPERIENCES

From 1st June 2015 to 30th April 2016 – Graduate visiting at Argonne National Labs, Chicago, Illinois.

From 1st January 2017 to 31st December 2017 – Fellow at University of Rome Tor Vergata "Study of the turbulent combustion process for gaseous fuels in lean metering conditions" Prot:0040107/2016 Disposizione N: 1332/2016.

From 1st January 2018 to 24th January 2019 – Fellow at University of Rome Tor Vergata "In-depth study of turbulent combustion processes for gaseous fuels in lean dosing conditions", Prot: 0039325/2017 Disposizione N: 2587/2017.

From 25th January 2019 to present – Assistant Professor at University of Rome Tor Vergata disciplinary sector ING-IND/08 – Machinery and Energy Systems.

5 NATIONAL AND INTERNATIONAL GROUPS PARTECIPATION

→ Collaboration with the University of Alabama on the development of innovative Dual-Fuel combustion methodologies. In particular, CFD analysis of combustion in low load conditions where high quantities of unburnt hydrocarbon were measured in the exhaust gases. After an initial phase of validation of the numerical models, the analysis is aimed at optimizing the combustion strategy, with particular focus on the timing of the highly reactive fuel injection.

→ Collaboration with the Argonne National Laboratories (Chicago, USA), started during the period spent at the laboratories as a graduate visitor, regarding the analysis of the high pressure gaseous fuel injection process for use in internal combustion engines. The analysis is aimed at optimizing the injection process in order to maximize its efficiency and the coupling of the gaseous flow with the cylinder charge motion to maximize the effectiveness of the mixing process.

→ Collaboration with the University of Salento on the analysis of the dual-fuel combustion process in lean charge conditions with particular attention to the injection phase and generation of the fuel-oxidizing mixture. The study aims to analyze the injection process at low rises and low energization times to evaluate the effect of these operating conditions on the evolution of the spray. The analysis carried out in the combustion chamber at constant volume will then focus on the study of the auto-ignition and subsequent combustion in order to analyze the effect of the local stratification of the two high and low reactivity fuels.

→ Collaboration with the Istituto Motori-STEMS regarding the analysis of the liquid fuel, gasoline and diesel injection process. Realization of a detailed and reliable 3D-CFD model for the study of the mixing process in

order to optimize the performance of direct injection engines for possible use with stratified charging strategies or with innovative ignition systems.

6 RESEARCH TOPICS

6.1 Main research activities

→ Analysis of the effect of different control strategies on the efficiency, resilience and economic convenience of hybrid power plants in the paradigm of distributed generation. The analysis is mainly focused on the effectiveness of predictive controls to improve the exploitation of renewable sources, favoring their penetration and reducing their impact on the main network.

→ Study of advanced conversion systems of biomass into bio-fuels. In particular of the anaerobic digestion and pyrolysis processes with particular focus on the recovery of waste products and attention to the valorization of the by-products of the conversion process.

→ Study of the turbulent combustion process of natural gas under partially stratified charge conditions with particular interest in engine operating conditions in order to optimize performance in terms of conversion efficiency and reduction of polluting emissions.

→ Analysis of the injection process from inward and outward opening injector for natural gas with particular interest in the fluid dynamic structures (shocks, vortices, etc) that are generated in the under-expanded areas and their effect on the resulting mixture formation process.

→ Analysis of the Dual Fuel combustion process, with particular regard to the effect of the stratification of the local charge on the auto-ignition process of the mixture and consequent combustion process. Analysis aimed at identifying specific combustion regimes as operating conditions change in order to maximize the exploitation of the benefits of low-temperature combustion over a wide range of operating conditions.

→ Numerical analysis of the Diesel and Gasoline injection process in order to maximize the effectiveness of the mixing process in direct injection engines by providing a reliable investigation tool for the study of this phenomena.

6.2 Conference organizer experiences

Since 2018	Session co-organizers of the “Internal Combustion Engine Fall Technical Conference – ASME – Track 3 Advanced Combustion – Session LTC/GCI/RCCI/HCCI”
June 2018	Direct contribution to the organization fo the “Hydrail 2018” conference at the University of Rome Tor Vergata

6.3 Journal Reviewer

Applied Energy
Energy
Fuel
Society of Automotive Engineers

7 PUBLICATIONS

Archival Journal Papers :	10
Conference Papers:	19
Google H index (30 January 2021)	9
Scopus H index (30 January 2021)	8

5 Main Archival Papers

1. Bartolucci L, Cordiner S, Mulone V, Rossi JL (2019). Hybrid renewable energy systems for household ancillary services. INTERNATIONAL JOURNAL OF ELECTRICAL POWER & ENERGY SYSTEMS, vol. 107, p. 282-297, ISSN: 0142-0615, doi: 10.1016/j.ijepes.2018.11.021 5 2019

2. Bartolucci L, Cordiner S, Mulone V, Pasquale S (2019). Fuel cell based hybrid renewable energy systems for off-grid telecom stations: Data analysis and system optimization. APPLIED ENERGY, vol. 252, ISSN: 0306-2619, doi: 10.1016/j.apenergy.2019.113386 7 2019

3. Bartolucci L, Cordiner S, Mulone V, Rocco V, Rossi JL (2018). Hybrid renewable energy systems for renewable integration in microgrids: Influence of sizing on performance. ENERGY, vol. 152, p. 744-758, ISSN: 0360-5442, doi: 10.1016/j.energy.2018.03.165 13 2018

4. Bartolucci L, Cordiner S, Mulone V, Rocco V, Rossi JL (2018). Renewable source penetration and microgrids: Effects of MILP–based control strategies. ENERGY, vol. 152, p. 416-426, ISSN: 0360-5442, doi: 10.1016/j.energy.2018.03.145 14 2018

5. Bartolucci L, Scarcelli R, Wallner T, Swantek A, Powell CF, Kanstengren S, Duke D (2016). CFD and X-Ray Analysis of Gaseous Direct Injection from an Outward Opening Injector. In: SAE 2016 World Congress and Exhibition. doi: 10.4271/2016-01-0850 23 2016

Place and Date _____.

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