UNIVERSITÀ DEGLI STUDI DI MODENA E REGGIO EMILIA
Ing. Stefano Fontanesi
Associate Professor
Dipartimento di Ingegneria "Enzo Ferrari"

CURRICULUM VITAE

CURRENT POSITION

Since 31-10-2015: Associate Professor at the Department of Engineering "Enzo Ferrari", University of Modena and Reggio Emilia. Discipline (SSD ING-IND/08) "Fluid Machineries and Energy Conversion Systems".

EDUCATION

26/02/2003: PhD in Mechanical Engineering at the University of Modena and Reggio Emilia. Title of the dissertation: " Numerical – experimental analysis of the performance of high specific power output internal combustion engines"**.**

TEACHING DUTIES

Since 2002, course on "CFD Simulation of powertrain systems" at the 2nd (last) year of the Master Degree in Automotive Engineering at the University of Modena and Reggio Emilia.
Since 2021, course on "Fundamentals of Fluid Machineries and Internal Combustion Engines" at the 3rd (last) year of the Bachelor Degree in Automotive Engineering at the University of Modena and Reggio Emilia

RESEARCH

Since 2007, head of "GRUppoMOtori", the ICE research group at the University of Modena and Reggio Emilia

Main research fields are:

- Simulation of turbulent flows using RANS, SAS and LES approaches
- RANS and LES simulation of turbulent combustion in engines, both SI and CI
- Advanced modelling of abnormal combustions, with particular reference to engine knock
- Modelling of heat transfer and thermo-mechanical stresses in engine components
- Modelling of fuel sprays and related phenomena (primary and secondary atomization, impingement)
- Modelling of fuel chemistry and development of smart strategies to incorporate it in 3D-CFD simulations

Author of nearly 150 scientific publications, particularly focusing CFD simulation of Internal Combustion Engines. Most of the publications are international journals with peer review process and international congresses with peer review process.

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Associate editor for the "SAE International Journal of Engines" since 2017.
Recipient of "Forest R. McFarland Award" 2020 for sustained outstanding contributions toward the work of the SAE Engineering Events
Current Scopus h-index: 33
Citations: 2680
ORCID: 0000-0002-3303-4229

RECENT PUBLICATIONS
(LAST TWO YEARS, JOURNAL PUBLICATIONS IN BOLD)

1. **Corda G., Cucurachi A., Fontanesi S., d'Adamo A., "Three-Dimensional CFD Simulation of a Proton Exchange Membrane Electrolysis Cell", Energies, 2023, 16 (16), art. no. 5968, https://doi.org/10.3390/en16165968**
2. **Berni F., Mortellaro F., Pessina V., Paltrinieri S., Pulvirenti F., Rossi V., Borghi M., Fontanesi S., "Modeling of gaseous emissions and soot in 3D-CFD in-cylinder simulations of spark-ignition engines: A methodology to correlate numerical results and experimental data", International Journal of Engine Research, 2023, 24 (5), pp. 2149 – 2174, https://doi.org/10.1177/14680874221112564**
3. **Corda G., Cucurachi A., Diana M., Fontanesi S., D'Adamo A., "A Methodology to Design the Flow Field of PEM Fuel Cells", SAE International Journal of Advances and Current Practices in Mobility, 2023, 5 (6), pp. 2078 – 2092, https://doi.org/10.4271/2023-01-0495**
4. Sfriso S., Berni F., Fontanesi S., D'Adamo A., Antonelli M., Frigo S., "A 3D-CFD Numerical Approach for Combustion Simulations of Spark Ignition Engines Fuelled with Hydrogen: A Preliminary Analysis", SAE Technical Papers, 2023, https://doi.org/10.4271/2023-01-0207
5. **Reina L., Grigore C., Cicalese G., Fontanesi S., "Analysis of the electrical and thermal behaviour of Li-ion batteries using 0D and 3D-CFD approaches with validation on experimental data", Journal of Physics: Conference Series, 2023, 2648 (1), art. no. 012044, https://doi.org/10.1088/1742-6596/2648/1/012044**
6. Torri F., Berni F., Fontanesi S., Mantovani S., Giacalone M., Defanti S., Bassoli E., Colombini G., "Evaluation of TPMS Structures for the Design of High Performance Heat Exchangers", SAE Technical Papers, 2023, https://doi.org/10.4271/2023-24-0125
7. Torri F., Berni F., Fontanesi S., Mantovani S., Giacalone M., Defanti S., Bassoli E., Colombini G., "Evaluation of TPMS Structures for the Design of High Performance Heat Exchangers", SAE Technical Papers, 2023, https://doi.org/10.4271/2023-24-0125

8. D'Orrico F., Cicalese G., Breda S., Fontanesi S., Cozza I., Tosi S., Gopalakrishnan V., "Predictive 3D-CFD Model for the Analysis of the Development of Soot Deposition Layer on Sensor Surfaces", SAE Technical Papers, 2023, https://doi.org/10.4271/2023-24-0012
9. Georgitzikis V., Breda S., Kalligeros C., Spitas V., Rogkas N., Cicalese G., D'Orrico F., Tzouganakis P., Fontanesi S., "Thermodynamic and Tribological Analysis of an Innovative Mechanism for Reciprocating Machines", SAE Technical Papers, 2023, https://doi.org/10.4271/2023-24-0016
10. Guiducci A., Barbieri S.G., Nuzzo S., Batater D., Berni F., Cicalese G., Fontanesi S., Franceschini G., "Refined Structural Design and Thermal Analyses of a High-Speed Wound-Field Generator for the More Electrical Aircraft", 2023, Proceedings - 2023 IEEE Workshop on Electrical Machines Design, Control and Diagnosis, WEMDCD 2023, https://doi.org/10.1109/WEMDCD55819.2023.10110937
11. **Barbato A., Iacovano C., Fontanesi S., "Cold-Flow Investigation of the Darmstadt Engine with Focus on Statistical Convergence: Experimental and Large Eddy Simulation Analysis", Flow, Turbulence and Combustion, 2023, 110 (1), pp. 59 – 89, https://doi.org/10.1007/s10494-022-00370-6**
12. **Berni F., Pessina V., Teodosio L., d'Adamo A., Borghi M., Fontanesi S., "An integrated 0D/1D/3D numerical framework to predict performance, emissions, knock and heat transfer in ICEs fueled with NH3–H2 mixtures: The conversion of a marine Diesel engine as case study", 2024, International Journal of Hydrogen Energy, 50, pp. 908 – 938, https://doi.org/10.1016/j.ijhydene.2023.09.158**
13. **Baker S.J., Fang X.H., Barbato A., Breda S., Magnani M., Fontanesi S., Leach F.C.P., Davy M.H., "Extracting vector magnitudes of dominant structures in a cyclic engine flow with dimensionality reduction", Physics of Fluids, 2024, 36 (2), art. no. 025131, https://doi.org/10.1063/5.0189368**
14. **Torri F., Berni F., Giacalone M., Mantovani S., Defanti S., Colombini G., Bassoli E., Merulla A., Fontanesi S., "A methodology to reduce the computational effort in 3D-CFD simulations of plate-fin heat exchangers", Applied Thermal Engineering, 245, art. no. 122843, https://doi.org/10.1016/j.applthermaleng.2024.122843**
15. **Iacovano C., Berni F., Cicalese G., Nuzzo S., Fontanesi S., "An integrated 2D/3D numerical methodology to predict the thermal field of electric motors", Case Studies in Thermal Engineering, 2024, 56, art. no. 104233, https://doi.org/10.1016/j.csite.2024.104233**
16. **Fontanesi S., Shamsudheen F.A., Gonzalez E.G., Sarathy S.M., Berni F., d'Adamo A., Borghi M., Breda S., "Impact of fuel surrogate formulation on the prediction of knock**

statistics in a single cylinder GDI engine", International Journal of Engine Research, 2024, 25 (3), pp. 405 – 423, https://doi.org/10.1177/14680874231195742

17. **Baker S.J., Fang X.H., Barbato A., Breda S., Magnani M., Fontanesi S., Leach F.C.P., Davy M.H., "Extracting vector magnitudes of dominant structures in a cyclic engine flow with dimensionality reduction", Physics of Fluids, 2024, 36 (2), art. no. 025131, https://doi.org/10.1063/5.0189368**
18. **Sfriso S., Berni F., Fontanesi S., d'Adamo A., Frigo S., Antonelli M., Borghi M., "Proposal and validation of a numerical framework for 3D-CFD in-cylinder simulations of hydrogen spark-ignition internal combustion engines", International Journal of Hydrogen Energy, 2024, 53, pp. 114 – 130, https://doi.org/10.1016/j.ijhydene.2023.12.027**

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