



Andrea Cavicchi

● WORK EXPERIENCE

06/2021 – CURRENT – Perugia, Italy

SOFTWARE DEVELOPER – TEST INDUSTRY - BIMAL

Software development for test stands for fluidic and mechanical applications in the fields of hydraulics, mechanics, automotive and aerospace.

- Siemens PLC controllers in Tia Portal Environment
- National Instrument c-Rio and c-DAQ in LabView environment
- Microsoft SQL server database management

01/02/2017 – 06/2021 – Perugia, Italy

POST-DOC RESEARCHER – UNIVERSITY OF PERUGIA - DEPARTMENT OF ENGINEERING

Research projects and collaborations with industrial partners on the following topics:

- Injection systems diagnostics for internal combustion engines (GDI, PFI, Diesel, SCR injectors).
- Spray characterization (imaging, sizing, velocimetry, spray momentum).
- Injector hydraulics (injection-rate, shot-to-shot variability, needle dynamics).
- Analysis of automotive fuel pumps (hydraulic and energetic performances).
- CFD 1-D simulation of injection systems using GT-Suite

Supervision of master degree thesis activity.

Experimental activity for mechatronic class at the master degree in mechanical engineering.

● EDUCATION AND TRAINING

01/01/2014 – 20/04/2017 – Via Duranti 95, Perugia, Italy

PHD IN INDUSTRIAL ENGINEERING – Università degli Studi di Perugia

Thesis: Development of a Novel Method for Estimating the Flow Rate Exiting Each Hole of a GDI Fuel Injector

www.unipg.it

15/09/2006 – 19/04/2012 – Via Duranti 95, Perugia, Italy

MASTER DEGREE IN MECHANICAL ENGINEERING (110/110) – Università degli Studi di Perugia

Thesis: GDI injector characterization by means of Momentum Flux and Phase Doppler Anemometry

www.unipg.it

● PUBLICATIONS

Local momentum flux measurement: An effective way for GDI spray targeting in flash boiling conditions

<https://doi.org/10.1016/j.fuel.2022.123454> – 2022

Cavicchi, A., Postrioti, L., Sorbini, G., & Brizi, G. (2022). Local momentum flux measurement: An effective way for GDI spray targeting in flash boiling conditions. *Fuel*, 317, 123454.

A zonal secondary break-up model for 3D-CFD simulations of GDI sprays

<https://doi.org/10.1016/j.fuel.2021.122064> – 2022

Berni, F., Sparacino, S., Riccardi, M., Cavicchi, A., Postrioti, L., Borghi, M., & Fontanesi, S. (2022). A zonal secondary break-up model for 3D-CFD simulations of GDI sprays. *Fuel*, 309, 122064.

Simultaneous needle lift and injection rate measurement for GDI fuel injectors by laser Doppler vib

<https://doi.org/10.1016/j.fuel.2020.119021> – 2021

Cavicchi, A., & Postrioti, L. (2021). Simultaneous needle lift and injection rate measurement for GDI fuel injectors by laser Doppler vibrometry and Zeuch method. *Fuel*, 285(June 2020), 119021.

Evaluation of hole-specific injection rate based on momentum flux measurement in GDI systems

<https://doi.org/10.1016/j.fuel.2019.116657> – 2020

Cavicchi, A., Postrioti, L., Berni, F., Fontanesi, S., & Di Gioia, R. (2020). Evaluation of hole-specific injection rate based on momentum flux measurement in GDI systems. *Fuel*, 263, 116657.

3D-CFD Simulation of a GDI Injector Under Standard and Flashing Conditions

<https://doi.org/10.1051/e3sconf/202019706002> – 2020

Sparacino, S., Berni, F., Riccardi, M., Cavicchi, A., & Postrioti, L. (2020). 3D-CFD Simulation of a GDI Injector Under Standard and Flashing Conditions. In *E3S Web of Conferences* (Vol. 197, p. 06002). EDP Sciences.

A Dynamic test bench for the assessment of common rail fuel injection systems impact on CO 2 emiss

<https://doi.org/10.4271/2019-01-0292> – 2019

Cavicchi, A., Postrioti, L., & Pesce, F. C. (2019). A Dynamic test bench for the assessment of common rail fuel injection systems impact on CO 2 emissions over the WLTP cycle. *SAE Technical Papers*.

Hydraulic analysis of a GDI injector operation with close multi-injection strategies

<https://doi.org/10.1016/j.fuel.2018.08.089> – 2019

Cavicchi, A., Postrioti, L., & Scarponi, E. (2019). Hydraulic analysis of a GDI injector operation with close multi-injection strategies. *Fuel*, 235.

Impact of the primary break-up strategy on the morphology of GDI sprays in 3D-CFD simulations of mu

<https://doi.org/10.3390/en12152890> – 2019

Sparacino, S., Berni, F., D'Adamo, A., Krastev, V. K., Cavicchi, A., & Postrioti, L. (2019). Impact of the primary break-up strategy on the morphology of GDI sprays in 3D-CFD simulations of multi-hole injectors. *Energies*, 12(15).

Evaluation of the Single Jet Flow Rate for a Multi-Hole GDI Nozzle

<https://doi.org/10.1063/1.5138776> – 2019

Cavicchi, A., Sparacino, S., Berni, F., Postrioti, L., & Fontanesi, S. (2019). Evaluation of the Single Jet Flow Rate for a Multi-Hole GDI Nozzle. *ATI* 2019.

Impact of different droplets size distribution on the morphology of GDI sprays: Application to multi-hole injectors

<https://doi.org/10.1063/1.5138872> – 2019

Sparacino, S., Berni, F., Cavicchi, A., & Postrioti, L. (2019, December). Impact of different droplets size distribution on the morphology of GDI sprays: Application to multi-hole injectors. In *AIP Conference Proceedings* (Vol. 2191, No. 1, p. 020139). AIP Publishing LLC.

Experimental and Numerical Analysis of Spray Evolution, Hydraulics and Atomization for a 60 MPa Inj

<https://doi.org/10.4271/2018-01-0271> – 2018

Postrioti, L., Cavicchi, A., Brizi, G., Berni, F., & Fontanesi, S. (2018). Experimental and Numerical Analysis of Spray Evolution, Hydraulics and Atomization for a 60 MPa Injection Pressure GDI System. SAE Technical Papers, 2018-April.

Experimental Analysis of Fuel and Injector Body Temperature Effect on the Hydraulic Behavior of Lat

<https://doi.org/10.4271/2018-01-0282> – 2018

Cavicchi, A., Postrioti, L., Pesce, F. C. C., & Ferrara, U. (2018). Experimental Analysis of Fuel and Injector Body Temperature Effect on the Hydraulic Behavior of Latest Generation Common Rail Injection Systems. SAE Technical Paper, 2018-April, 1–15.

A Methodology for the Estimation of Hole-to-Hole Injected Mass Based on Spray Momentum Flux Measure

<https://doi.org/10.4271/2017-01-0823> – 2017

Mariani, A., Cavicchi, A., Postrioti, L., & Ungaro, C. (2017). A Methodology for the Estimation of Hole-to-Hole Injected Mass Based on Spray Momentum Flux Measurement. SAE Technical Papers 2017-01-0823, 2017-March(March).

Experimental and Numerical Assessment of Multi-Event Injection Strategies in a Solenoid Common-Rail

<https://doi.org/10.4271/2017-24-0012> – 2017

Piano, A., Boccardo, G., Millo, F., Cavicchi, A., Postrioti, L., & Pesce, F. C. (2017). Experimental and Numerical Assessment of Multi-Event Injection Strategies in a Solenoid Common-Rail Injector. SAE Technical Papers, 2017-Sept(4).

Analysis of PDA measurements in double injection GDI sprays

<https://doi.org/10.4995/ILASS2017.2017.5007> – 2017

Araneo, L., Dondè, R., Postrioti, L., & Cavicchi, A. (2017). Analysis of PDA measurements in double injection GDI sprays. Proceedings ILASS-Europe 2017. 28th Conference on Liquid Atomization and Spray Systems, September, 6–8.

Numerical and experimental analysis of the spray momentum flux measuring on a GDI injector

<https://doi.org/10.1016/j.fuel.2017.06.054> – 2017

Cavicchi, A., Postrioti, L., Giovannoni, N., Fontanesi, S., Bonandrini, G., & Di Gioia, R. (2017). Numerical and experimental analysis of the spray momentum flux measuring on a GDI injector. *Fuel*, 206, 614–627.

Numerical and Experimental Assessment of a Solenoid Common-Rail Injector Operation with Advanced In

<https://doi.org/10.4271/2016-01-0563> – 2016

Piano, A., Millo, F., Postrioti, L., Biscontini, G., Cavicchi, A., & Pesce, F. C. F. C. F. C. (2016). Numerical and Experimental Assessment of a Solenoid Common-Rail Injector Operation with Advanced Injection Strategies. SAE International Journal of Engines, 9(1), 2016-01-0563.

An experimental and numerical analysis of pressure pulsation effects of a Gasoline Direct Injection

<https://doi.org/10.1016/j.fuel.2016.01.012> – 2016

Postrioti, L., Cavicchi, A., Paolino, D., Guido, C., Parotto, M., & Di Gioia, R. (2016). An experimental and numerical analysis of pressure pulsation effects of a Gasoline Direct Injection system. Fuel, 173, 8–28.

Momentum Flux Measurement on Single-Hole GDI Injector under Flash-Boiling Condition

<https://doi.org/10.4271/2015-24-2480> – 2015

Postrioti, L., Bosi, M., Cavicchi, A., AbuZahra, F., Di Gioia, R., Bonandrini, G., Zahra, F. A., Di Gioia, R., & Bonandrini, G. (2015). Momentum flux measurement on single-hole GDI injector under flash-boiling condition. SAE Technical Papers, 24(2480).

Dynamic behavior of a spring-powered micronozzle needle-free injector

<https://doi.org/10.1016/j.ijpharm.2015.05.067> – 2015

Schoubben, A., Cavicchi, A., Barberini, L., Faraon, A., Berti, M., Ricci, M., Blasi, P., & Postrioti, L. (2015). Dynamic behavior of a spring-powered micronozzle needle-free injector. International Journal of Pharmaceutics, 491(1–2), 91–98.

LANGUAGE SKILLS

Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C1	C1	C1	C1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

COMMUNICATION AND INTERPERSONAL SKILLS

Team-working

I have been working for several years in a reserch group where collaboration and team-working are mandatory skills.

DIGITAL SKILLS

Microsoft

Microsoft Excel | Microsoft Word | Power Point | Outlook | SQL (SQL Server)

CAD

CAD (SolidWorks Inventor Solid Edge)

program language

NI LABVIEW | PLC SIEMENS SIMATIC | Siemens TIA Portal

CFD simulation

GT-Suite

● DRIVING LICENCE

Driving Licence: B

PERUGIA, 14/03/2022