

Curriculum Vitae



First name/ Surname **Alberto Cerofolini, PhD**

Address

Telephone(s)

E-mail

Nationality Italian

Date of birth

Gender Male

Work experience

Dates **Feb 2014 - onwards**

ALMA Automotive

Ferrari GES (Formula 1 Team) (resident consultant, Apr 2014 – Dec 2018)

Occupation or position held **ALMA Automotive: Senior Control Systems and Software Development Engineer**

Ferrari GES (Formula 1):

Main activities and responsibilities

- Apr 14 - Aug 16: **Control Group** (F1 Team, Power Unit, Electronics)
- Sep 16 – Dec 18: **Power Unit Performance Group** (F1 Team, Power Unit, Development)
- **ALMA Automotive**, Feb 14 - Mar 14:
 - Development of open ECU environment for motorcycle engine applications;
 - Design of Simulink-based ICE control system and first experimental SiL/HiL tests.

Name and address of employer ALMA Automotive
Via Terracini 2/c, 40131 Bologna (BO) Italy
<http://www.alma-automotive.it/>

- **Ferrari GES (Formula 1), Power Unit Performance Group**, Gen 2019 - onwards:
 - Power Unit Development:
 - · Definition of lap time-wise most profitable design directions;
 - · Definition of performance metrics and indexes, integrating Power Unit Department with Vehicle Departments, i.e. Aero and Cooling mainly;
 - · Generation of simulation tools to evaluate the effect of new hardware components or high-level control strategies, e.g. 0D/1D Simulink-based Power Unit models.
 - · Competitors monitoring
 - Power Unit Performance Monitoring:
 - · Definition of performance metrics for reporting real-time PU losses analysis.
 - · Remote Garage support during Race Events:
 - Identification of main track performance losses and assistance to the solution finding process;
 - Coordinate integrated Power Unit - Vehicle strategies, delivering guidelines for the overall optimal usage in the current event.
 - · Track: Budapest 2016 (T4) FIA Official Test.
 - Power Unit Optimal Control: design of benchmarking high-level PU strategies aimed at optimizing lap time for reference missions.

Name and address of employer

Ferrari S.p.A.
Via Emilia Est 1163 Modena (MO), Italy
<http://www.ferrari.com>

Type of business or sector

Automotive, Formula 1 Team

Dates

Mar 2011 - Jan 2014

University of Bologna, Department of Industrial Engineering (DIN) - Prof. Cavina, Prof. Moro

ETH Zürich (CH) - Institute of Dynamic Systems and Control (IDSC) - Academic Guest (Jul 2013 - Feb 2014, Prof. Guzzella)

Occupation or position held

Ph-D in Mechanics and Engineering Advanced Science (2011-2013)

Research Field: Modeling, Control and Diagnosis of Internal Combustion Engines

Main activities and responsibilities

Research and experimental activities:

- Activities supported by MAGNETI MARELLI S.p.A. (2011-2012):
 - Development and test-bench validation of model-based algorithms for air mass flow rate estimation in a Turbocharged engine, via on-board UEGO/NOx sensors;
 - Modeling and experimental tests of fast FFT algorithms to estimate and control individual cylinder air-fuel ratio in Turbocharged engines, aimed at on-board implementation for standard ECUs.
- Development of a full (longitudinal and lateral) vehicle dynamics model, built within Simulink® Environment.
- Control-oriented parametric turbocharger modeling for MVEM simulations, based on compressor and turbine geometric properties.

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| Name and address of employer | <ul style="list-style-type: none"> • Activities supported by <u>IAV GmbH</u> (2012-2013): <ul style="list-style-type: none"> ○ Development of advanced on-line supervisory control algorithms for parallel hybrid vehicles (electric and mechanical); ○ Optimization and benchmarking of control policies for different hybrid vehicle architectures, aided by Dynamic Programming. • Activities supported by <u>Daimler AG</u> (ETH Zurich, 2013-2014): <ul style="list-style-type: none"> ○ On-line optimization of pollutant emissions and fuel economy in Hybrid Electric Vehicles, based on Optimal Control Theory. • Member of the Organizational Committee: ATI 2013 Italian Congress: "<i>Energia, Ambiente, Macchine e Impianti</i>", Bologna, Scuola di Ingegneria e Architettura, 12-14 Sep 2013. |
| Type of business or sector | Automotive technology, ICE and powertrain modelling and control, test bench. |

Dates **Jan 2010 - Feb 2011**

Fresenius Kabi AG (Fresenius GmbH)

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|--------------------------------------|---|
| Occupation or position held | Process engineer |
| Main activities and responsibilities | Main activities: <ul style="list-style-type: none"> • responsible for the development of a capacity enhancement project, i.e. a new production unit for convective air drying of solvent vapors from a polymeric biomedical tissue; • responsible for the optimization trial in the start-up phase of a regenerative combustion plant, (solvent vapor-air mixture with downstream heat recovery section for process filtered hot-air) with focus on energetic efficiency and control system performances; • Other projects: production efficiency enhancement to reach saving targets, instrumentation and control devices selection and testing for HVAC plants in clean room applications. |
| Name and address of employer | <u>Fresenius Kabi AG (Fresenius GmbH)</u> Via San Pietro 1, 41037 Mirandola (MO), Italy |
| Type of business or sector | Biomedical |

Publications

- | | |
|------|---|
| 2017 | <ul style="list-style-type: none"> • Nicolo Cavina, Andrea Businaro, Matteo De Cesare, Federico Monti, Alberto Cerofolini: "Application of Acoustic and Vibration-Based Knock Detection Techniques to a High Speed Engine". <i>WCX™ 17: SAE World Congress Experience; 03/2017, DOI:10.4271/2017-01-0786</i> |
| 2016 | <ul style="list-style-type: none"> • Nicolò Cavina, Nahuel Rojo, Andrea Businaro, Lorella Ceschini, Eleonora Balducci, Alberto Cerofolini: "Analysis of Pre-ignition Combustions Triggered by Heavy Knocking Events in a Turbocharged GDI Engine". <i>Energy Procedia 11/2016; 101:893-900., DOI:10.1016/j.egypro.2016.11.113</i> • Vittorio Ravaglioli, Fabrizio Ponti, Enrico Corti, Alberto Cerofolini: "Development of a Torsionmeter for On-board Application". <i>Energy Procedia 11/2016; 101:646-653., DOI:10.1016/j.egypro.2016.11.082</i> • Nicolò Cavina, Andrea Businaro, Nahuel Rojo, Matteo De Cesare, Luigi Paiano, Alberto Cerofolini: "Combustion and Intake/Exhaust Systems Diagnosis Based on Acoustic Emissions of a GDI TC Engine". <i>Energy Procedia 11/2016; 101:677-684., DOI:10.1016/j.egypro.2016.11.086</i> |

- 2015 • V. Ravaglioli, N. Cavina, A. Cerofolini, E. Corti, D. Moro, F. Ponti: "**Automotive Turbochargers Power Estimation Based on Speed Fluctuation Analysis**". *Energy Procedia* 12/2015; 82:103-110., DOI:10.1016/j.egypro.2015.11.889
- 2014 • Bianchi M., Cavina N., Cerofolini A., De Pascale A., Melino F., "**Wind-Hydro-Gas Turbine Unit Commitment to guarantee Firm Dispatchable Power**", Accepted for publication at *Proceedings of GT2014, June 16-20 Dusseldorf, Germany*.
- Tobias Nüesch, Alberto Cerofolini, Giorgio Mancini, Nicolo Cavina, Christopher Onder, Lino Guzzella: "**Equivalent Consumption Minimization Strategy for the Control of Real Driving NOx Emissions of a Diesel Hybrid Electric Vehicle**". *Energies* 05/2014; 7(5):3148-3178., DOI:10.3390/en7053148
- Michele Bianchi, Lisa Branchini, Nicolò Cavina, Alberto Cerofolini, Enrico Corti, Andrea De Pascale, Valentina Orlandini, Francesco Melino, Davide Moro, Antonio Peretto, Fabrizio Ponti: "**Managing Wind Variability with Pumped Hydro Storage and Gas Turbines**". *Energy Procedia* 12/2014; 45:22–31., DOI:10.1016/j.egypro.2014.01.004
- Enrico Corti, Nicolò Cavina, Alberto Cerofolini, Claudio Forte, Giorgio Mancini, Davide Moro, Fabrizio Ponti, Vittorio Ravaglioli: "**Transient Spark Advance Calibration Approach**". *Energy Procedia* 12/2014; 45:967-976., DOI:10.1016/j.egypro.2014.01.102
- E. Corti, A Cerofolini, N. Cavina, C. Forte, G. Mancini, D. Moro, F. Ponti, V. Ravaglioli: "**Automatic Calibration of Control Parameters based on Merit Function Spectral Analysis**". *Energy Procedia* 12/2014; 45:919-928., DOI:10.1016/j.egypro.2014.01.097
- 2013 • Cavina N., Cerofolini A., Corti E., Ponti F. (University of Bologna), De Cesare, M., Stola F. (Magneti Marelli S.p.A.), "**Innovative Techniques for On-Board Exhaust Gas Dynamic Properties Measurement**", SAE Paper 2013-01-0305. (SAE World Congress 2013, Detroit, USA 2013). Published on *SAE International Journal of Engines* 6(1), 05/2013; 6(1-1):217-227., DOI:10.4271/2013-01-0305
- Dingel O., Pini N., Ross J., Trivic I. (IAV GmbH), Cavina N., Cerofolini A. (University of Bologna), Rioli M. (IEV S.r.l.), "**Benchmarking Hybrid Concepts: On-line vs. Off-line Fuel Economy Optimization for Different Hybrid Architectures**". SAE Paper 2013-24-0084, accepted for publication on *SAE International Journal of Alternative Powertrains*, Dec. 2013, 2(3-3):456-470., DOI:10.4271/2013-24-0084
- 2012 • Cavina N., Cerofolini A. (University of Bologna), De Cesare, M., Stola F. (Magneti Marelli S.p.A.), "**UEGO-based Exhaust Gas Mass Flow Rate Measurement**", SAE Paper 2012-01-1627. *SAE Powertrain Fuels and Lubricants, Malmö, Sweden 10/2012*, DOI:10.4271/2012-01-1627

Education and training

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| Dates | <u>Jun 2014: Ph-D in Mechanics and Engineering Advanced Science</u> |
| Principal subjects | Defense: "Optimal Supervisory Control of Hybrid Vehicles" |
| Name and type of organisation providing education and training | <i>University of Bologna - ETH Zurich (Academic Guest, Jul 2013 - Feb 2014)</i> |
| Dates | <u>Jan 2011: Qualified Industrial Engineering</u> (2 nd level degree – State exam for section A and Industrial Sector) |
| Name and type of organisation providing education and training | <i>University of Modena e Reggio Emilia</i> |
| Dates | <u>Dec 2009: Master Degree in Mechanical Engineering</u> with score 110/110 cum laude |
| Principal subjects | Final Thesis: "Testing procedures of a hydroelectric plant with Pelton turbine" |
| Name and type of organisation providing education and training | <i>University of Bologna</i> |
| Dates | <u>Oct 2006: Bachelor Degree in Mechanical Engineering</u> with score 110/110 cum laude |
| Principal subjects | Final Thesis: "The effects of initial clearance on the stress concentration factor in a connecting rod eye: numerical study" |

Name and type of organisation providing education and training

University of Modena e Reggio Emilia

Dates

Jun 2003: High School Diploma with score 100/100

Name and type of organisation providing education and training

Science High School "A. Tassoni", Modena

Personal skills and competences

Mother tongue(s)

Italian

Other language(s)

English - German

Self-assessment

| | Understanding | | | | Speaking | | | | Writing | |
|----------------|---------------|------------------|---------|------------------|--------------------|------------------|-------------------|------------------|---------|------------------|
| | Listening | | Reading | | Spoken interaction | | Spoken production | | | |
| English | C1 | Proficient user | C1 | Proficient user | C1 | Proficient user | C1 | Proficient user | C1 | Proficient user |
| German* | B1 | Independent user | B1 | Independent user | B1 | Independent user | B1 | Independent user | B1 | Independent user |

** Zertifikat Sprachenzentrum der Universität Zürich: Herbstsemester 2013 (Note 6/6)*

Computer skills and other competences

- Mac OS®, Windows®, Internet browsers: expert user
- Microsoft Office® and similar SW's: expert user
- MATLAB-Simulink®: expert user
- LMS AmeSim®, MSC Visual Nastran®: good knowledge
- GT-Power, WaveRT: good familiarity
- Minitab®: good knowledge
- MSC Marc®, MSC Adams®: good knowledge
- AutoCAD® 2D and similar: expert user
- Engine Test Bench Software: ETAS Inca - AVL Puma: good familiarity
- Engine Test Bench Instrumentation: good knowledge

Driving licence

Italian Driving Licence, Type B

Pages

Research:

- Google Scholar:
<https://scholar.google.it/citations?user=SNBHVxsAAAAJ&hl=en&oi=ao>
- Research Gate:
https://www.researchgate.net/profile/Alberto_Cerofolini
- PhD Thesis download page:
<http://amsdottorato.unibo.it/6357/>