



## Curriculum Vitae

### Personal information

First name / Surname

**Gianluca Pepe**

### Occupational field

**Mechanical engineering research**

**Dates**

2014 - 2021

Title of qualification awarded

Professor under contract of 3CFU of Vehicle Systems Dynamics to the Department of Computer, Control, and Management Engineering Antonio Ruberti at Sapienza University of Rome (2015-2020)

Professor under contract of Lab of Vehicle Dynamics to the Dep. of Mechanical and Aerospace Engineering at Sapienza University of Rome (2019-2020)

Abilitazione Scientifica Nazionale Settore Concorsuale: 09/A2, Fascia: 2

Researcher of the Sapienza University of Rome. Winner of "Assegno di Ricerca" in "*Study of innovative systems for sensorization and control of mechanical systems.*" (2014-2020)

Professor under contract of master in "Law on Computer Science"; Robotics, Ethics and Law; at Sapienza University of Rome (2017).

Responsible of the Sapienza laboratory of Vehicle Dynamic and Mechatronics of Cisterna di Latina

Conduction of seminars for the Mechatronic Systems and Laboratory of Vehicle Dynamics courses and for the Master Inventive Engineering at Sapienza University of Rome

Principal subjects/occupational skills covered	<p>Researcher activities</p> <ul style="list-style-type: none"> <li>- Development of nonlinear feedback controllers based on variational calculus.</li> <li>- Development of a mathematical model for the optimization of the gaits of quadrupedal robots</li> <li>- Design and realization of <i>AutoSapiens</i>: the first autonomous car of Sapienza University</li> <li>- Design of obstacles avoidance algorithms for autonomous driving vehicles</li> <li>- Design and prototyping of an innovative magneto-rheological suspension car patented</li> <li>- Grip tire detection and analysis patented: developing new experimental setup</li> <li>- Development of new optimal control logic for semi-active nonlinear control systems</li> <li>- Analysis and prototyping of innovative mechatronic control systems: programming and implementation</li> </ul>
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Activities with private public companies in the context of the automotive and robot field:

- Prototype project for mechanical cooperation and interconnection of marine, submarine and air vehicles (CNR-INM)
- Design and realization of an autonomous safe robot boat (Fincantieri)
- Realization of smart material with optical strain sensor embedded in glass fiber bar (BASF)
- Accident detection and drive style behaviour by suitable sensors (OCTO Telematics - Company)
- Robot sensorization for datafusion and feedback control (ICAP Group)
- Development of an automated system for the chlorination of drinking water (Fincantieri-Sultan)

## Education

<b>Dates</b>	2010 – 2013
Title of qualification awarded	PhD student in Theoretical and Applied Mechanics in Mechanical Engineering at “La Sapienza” University of Rome.
Principal subjects/occupational skills covered	<p>Analysis, design and prototyping of an innovative high-speed marine vehicle on the project “SeaLab” <a href="http://w3.uniroma1.it/sealab/">http://w3.uniroma1.it/sealab/</a></p> <p>SeaLab research lines:</p> <ul style="list-style-type: none"> <li>- Architectural design of the new vessel equipped with a smart suspension system</li> <li>- Semi active suspension system controlled</li> <li>- Innovative systems for vehicle control and stability</li> <li>- Anti-shock and vibration control systems</li> <li>- FBG monitoring and self-diagnosis of structures</li> <li>- Composite materials based on natural fibres with the embedding of FBG sensors</li> <li>- Propulsion systems (hydro jets &amp; micro-turbines jets)</li> </ul> <p>Organized conference: SEALAB 2012, Rome, Italy “<i>High-Tech and new strategies of cooperation between universities and business</i>” – Coordinator and Author</p>
<b>Dates</b>	2011
Title of qualification awarded	“Esame di Stato”. Enabled to the profession of Engineer by passing the Italian State Exam for the industrial sector.
Name and type of organisation	Engineer Register “Ordine degli Ingegneri” of Rome, Section A Industrial
<b>Dates</b>	2006 – 2010
Title of qualification awarded	“Laurea Specialistica” in Mechanical Engineering with specialization in mechanical constructions: Italian degree similar to a master's degree
Name and type of organisation providing education and training	Faculty of Engineering “La Sapienza” University of Rome, 18 via Eudossiana, 00184, Rome
<b>Dates</b>	2001 – 2006
Title of qualification awarded	“Laurea” in Mechanical Engineering: Italian degree similar to a bachelor's degree
Name and type of organisation providing education and training	Faculty of Engineering “La Sapienza” University of Rome, 18 via Eudossiana, 00184, Rome

**Dates** 1995 – 2001

Title of qualification awarded "Maturità Scientifica": similar to Leaving Certificate in Scientific Studies.

Name and type of organisation providing education and training Liceo Scientifico *Istituto Montessori* of Rome

### Advanced training courses

Master RED Research enhancement & development SSAS (School for Advanced Studies of Sapienza) on "*Management, development and transfer of research results*" 2013, Rome, Italy

Course for doctoral candidates on: "*Vehicle Dynamics Control*", SIDRA 2013, Bertinoro, Italy

Course for doctoral candidates on: "*Active and Passive Vibration Control of Structures*", CISM 2013, Udine, Italy

Summer school course for doctoral candidates on: "*Applied Research: from university to industry*" Santander, Spain, 2013

Participation to the course RYLA, "The leadership of the newcomer", Project Manager Dott.sa E. Vernoni - Rotary Club of West Rome

### Publications and patents

Pepe G, Elena Paifelman, Antonio Carcaterra, Optimal feedback control law for viscoelastic materials with memory effects, EUROODYN 2020, XI International Conference on Structural Dynamics, Streamed from Athens, Greece 2020

Mezzani F., Pepe G., Roveri N, Carcaterra A., Solferini S., Demining war scenarios: a project based on new technologies, EUROODYN 2020, XI International Conference on Structural Dynamics, Streamed from Athens, Greece 2020

Laurenza M., Pepe G., Carcaterra A.; Auto-sapiens, an experimental autonomous driving system; EUROODYN 2020, XI International Conference on Structural Dynamics, Streamed from Athens, Greece 2020

Roveri, N., Milana, S., Culla, A., Conte, P., Pepe, G., Mezzani, F., and Carcaterra, A., 'Machine learning and sensor swarm for structural health monitoring of a bridge', ISMA2020, Leuven, Belgium, 2020

Mesbahi, S., Milana, S., Culla, A., Pepe, G., Roveri, N., and Carcaterra, A., 'Inertial properties control by variable damping actuators and application to automotive suspensions', ISMA2020, Leuven, Belgium, 2020

Pepe G; Paifelman E; Carcaterra A; Volterra models of magnetorheological dampers and their application to vibrating systems, ISMA2020, Leuven, Belgium, 2020

Laurenza, M., Pepe, G., Carcaterra, A.; Auto-sapiens autonomous driving vehicle; VEHITS 2020 - Proceedings of the 6th International Conference on Vehicle Technology and Intelligent Transport Systems, 2020, pp. 361–369

Pepe G, Mezzani F, Carcaterra A, Cedola L, Rispoli F, Variational Control Approach to Energy Extraction from a Fluid Flow, *Energies* 2020, 13, 4913; doi:10.3390/en13184913

Roveri, N., Carcaterra, A., Molinari, L., Pepe, G. Safe and secure control of swarms of vehicles by small-world theory (2020) *Energies*, 13 (5), art. no. 1043

Roveri, N., Pepe, G., Mezzani, F., Carcaterra, A., Culla, A., Milana, S. OPTTYRE—Real time estimation of rolling resistance for intelligent tyres (2019) *Sensors* (Switzerland), 19 (23), art. no. 5119

Laurenza, M., Pepe, G., Antonelli, D., Carcaterra, A. Car collision avoidance with velocity obstacle approach: Evaluation of the reliability and performance of the collision avoidance maneuver (2019) 5th International Forum on Research and Technologies for Society and Industry: Innovation to Shape the Future, RTSI 2019 - Proceedings, art. no. 8895525, pp. 465-470.

Pepe, G., Laurenza, M., Antonelli, D., Carcaterra, A. A new optimal control of obstacle avoidance for safer autonomous driving (2019) 2019 AEIT International Conference of Electrical and Electronic Technologies for Automotive, AEIT AUTOMOTIVE 2019, art. no. 8804549

Nesi, L., Pepe, G., Bibuli, M., Zereik, E., Carcaterra, A., Caccia, M. A new tow maneuver of a damaged boat through a swarm of autonomous sea drones (2019) *IFAC-PapersOnLine*, 52 (21), pp. 360-366.

G. Pepe, N. Roveri, A. Carcaterra, Experimenting Sensors Network for Innovative Optimal Control of Car Suspensions, *Sensors*, MDPI, 2019

Pinto M., Pepe G., Roveri N., Carcaterra A., Swarm of robot attacking an acoustic source: detection and trapping, 48th International Congress and Exhibition on Noise Control Engineering, INTER-NOISE 2019, MADRID, Spain, 2019

Antonelli D., Nesi L., Pepe G., Carcaterra A., A novel control strategy for autonomous cars, American Control Conference ACC 2019, Philadelphia, USA, 2019

E. Paifelman, G. Pepe, A. Carcaterra, "An optimal indirect control of underwater vehicle", *International Journal of Control*, 2019

Paifelman E., Pepe G., Carcaterra A., Optimal control with memory effects: theory and application to wings, 17th European Control Conference (ECC19), Naples, Italy, 2019

Antonelli D., Nesi L., Pepe G., Carcaterra A., A novel approach in Optimal trajectory identification for Autonomous driving in racetrack, 17th European Control Conference (ECC19), Naples, Italy, 2019

M. Pinto, N. Roveri, G. Pepe, A. Carcaterra, A theory of swarm of sensors for vibration monitoring of large structures, Nodycon 2019, Rome, Italy, 2019

L. Nesi, D. Antonelli, G. Pepe, A. Carcaterra, Fast moving of a population of robots through a complex scenario, Nodycon 2019, Rome, Italy, 2019

D. Antonelli, G. Pepe, L. Nesi, A. Carcaterra, Feedback local optimality principle applied to rocket vertical landing VTVL, Nodycon 2019, Rome, Italy, 2019

Pinto M., Roveri N., Pepe G., Nicoletti A., Balconi G., Carcaterra A., "Extraction of the beam elastic shape from uncertain FBG strain measurement points", *Mechanisms and Machine Science*, Italy 2018

Antonelli, D., Nesi, L., Pepe, G., and Carcaterra, A., "Mechatronic control of the car response based on vfc", ISMA2018, Leuven, Belgium, 2018

Pepe, G., Antonelli, D., Nesi, L., and Carcaterra, A., 'Flop: feedback local optimality control of the inverse pendulum oscillations', ISMA2018, Leuven, Belgium, 2018

Pinto, M., Roveri, N., Pepe, G., Nicoletti, A., Balconi, G., and Carcaterra, A., 'Embedded optical sensors for vibration monitoring of large structures', ISMA2018, Leuven, Belgium, 2018

Paifelman, E., Pepe, G., La Gala, F., and Carcaterra, A., 'Control of fluctuations of a tethered unmanned-underwater-vehicle', ISMA2018, Leuven, Belgium, 2018

E. Paifelman, G. Pepe, A. Carcaterra, "Optimal Control of Underwater Vehicle", *International Journal of Control*, 2018 (under review)

Culla A., Pepe G., Carcaterra, A., "Nonlinear unsteady energy analysis of structural systems", *The Journal of the Acoustical Society of America*, 2017

S. Pensalfini, F. Coppo, F. Mezzani, G. Pepe, A. Carcaterra, "Optimal control theory based design of elastomagnetic metamaterial", *Eurodyn*, Rome, Italy 2017

F. Coppo, G. Pepe, N. Roveri, A. Carcaterra, "A Multisensing setup for the intelligent tire monitoring", *Sensors*, 2017

N. Roveri, G. Pepe, F. Coppo and A. Carcaterra, "Rolling Tyre: Real-Time Detection of Patch-Contact and Dissipation", ISMA2016, Leuven, Belgium, 2016

A. Carcaterra, G. Pepe and N. Roveri, "Energy Exchange between Nonlinear Oscillators: An Entropy Foundation", ISMA2016, Leuven, Belgium, 2016

G. Pepe, N. Roveri and A. Carcaterra, "Prototyping a new car semi-active suspension by Variational Feedback Controller", ISMA2016, Leuven, Belgium, 2016

G. Pepe and A. Carcaterra, "VFC – Variational Feedback Controller and its application to semi-active suspensions," *Mechanical Systems and Signal Processing*, 2016

A. Carcaterra and G. Pepe, "Variational Control Approach to Energy Extraction from a Fluid Flow " presented at the Offshore Wind and other marine renewable Energies in Mediterranean and European Seas- OWEMES 8th Ed, 2015

N. Roveri, G. Pepe, and A. Carcaterra, "OPTYRE – A new technology for tire monitoring: Evidence of contact patch phenomena," *Mechanical Systems and Signal Processing*, 2015

G. Pepe, I. Giorgio, A. Carcaterra, D. Del Vescovo, and A. Sestieri, "Semiactive vibration control via VFC-Variational Feedback by piezoelectric actuation," in *NOVEM2015*, 2015

G. Pepe and A. Carcaterra, "VFC - Variational Feedback Control applied to semi-active car suspensions," in *NOVEM2015*, 2015

G. Pepe and A. Carcaterra, "A new semi-active variational based damping control," in *MESA 2014 - 10th IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications, Conference Proceedings*, 2014

G. Pepe, A. Carcaterra, I. Giorgio, and D. Del Vescovo, "Variational Feedback Control for a nonlinear beam under an earthquake excitation," *Mathematics and Mechanics of Solids*, 2014

A. Carcaterra, N. Roveri, G. Pepe, "Fractional dissipation generated by hidden wave-fields" *Mathematics and Mechanics of Solids*, 2014

Pepe, G., Carcaterra, A. Semi-active damping by variational control algorithms, Proceedings of the International Conference on Structural Dynamic EUROSDY 2014, pp. 1721-1727, 2014

N. Roveri, G. Pepe, A. Carcaterra, "Hilbert-Huang analysis of semi-active controllers", *Eurodyn*, Porto, Portugal 2014

G. Pepe, A. Carcaterra "Experimental results of real car suspensions using new damper controllers", Eurodyn, Porto, Portugal 2014

A. Carcaterra, G. Pepe, "Architecture of a new semi-active suspension system and associated control logic" Patent number: RM2014A000040, 2014

A. Calabria, R. Capata, M. Di Veroli, G. Pepe, "Testing of the ultra-micro gas turbine devices (1 – 10 kw) for portable power generation at UDR1: the test bench facility and first tests results", Scientific Research, Engineering, 2013

G. Pepe, A. Carcaterra, "High speed fluttering skids with elastic suspensions", NAV2012, Napoli, Italy, 2012

G. Pepe, A. Carcaterra, "Fluttering skid phenomena in high speed marine vehicles", ISMA2012, Leuven, Belgium, 2012

A. Carcaterra, A. Scorrano, G. Pepe, A. Sestieri, "SEALAB: Aero-hydro mechanics of an extreme-speed marine vehicle", AIMETA, Bologna, Italy, 2011

G. Pepe, A. Carcaterra, A. Scorrano, A. Sestieri, "Stability analysis of a three-wings high-speed craft", AIMETA, Bologna, Italy, 2011

A. Carcaterra, A. Scorrano, G. Pepe, "SEALAB: Aero-hydro mechanics of a three-wings jumping vehicle", International Symposium on High Speed Marine Vehicles, Napoli, Italy, 2011

**Personal skills and competence**

Self-assessment

European level

**Language**

Understanding				Speaking				Writing	
Listening		Reading		Spoken interaction		Spoken production			
B2	English	B2	English	B2	English	B2	English	B2	English

Social skills and competences

Good teamwork and good communication skills

Good attitude to the management of projects

Computer skills and competences

Good knowledge of programming languages: Matlab™, Mathematica™, Arduino™, Pascal™, Visual Basic™

Good knowledge of the following programs of design: Rhinoceros™, Vray™, AutoCAD™, SolidWorks™,

Good knowledge of FEM analysis: ANSYS™

Excellent knowledge of Office™ tools (Word™, Excel™ and PowerPoint™)

Good knowledge of graphic design software PhotoShop™

Artistic skills and competences

Photography, Classical guitar

Other skills and competences

Model aircraft and drones; Electronic prototyping with Arduino™; Sports: sailing and free climbing

Driving licence

Driving license A and B; Boat license without limits

Date 09/01/2021