

PERSONAL INFORMATION

Name **Alberto Martini**
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Nationality Italian
Date of birth 18/11/1981
Gender male



CURRENT ACADEMIC POSITION

October 2022 to date

Academic discipline
Institution

Main fields of activity

Associate Professor

Mechanical Engineering – Mechanics of Machines

University of Bologna, DIN – Department of Industrial Engineering, Viale del Risorgimento 2, 40136 Bologna (BO), Italy

Research in the fields of Mechanics and Dynamics of Machines (Vibration monitoring of mechanical systems, flexible multibody dynamics, static balancing of mechanisms) and Vehicle Dynamics (digital twins for vehicle dynamic response, state estimation, parameter identification).
Teaching activity in the field of Mechanics of Machines, Vehicle Dynamics, Industrial Robotics.

EDUCATION AND QUALIFICATIONS

November 2018

Area
Institution

Italian Qualification for Associate Professor

09/A2 – Mechanics of Machines
MIUR – Italian Ministry of Education, Universities and Research

January 2008 – December 2010

Dissertation
Topics of investigation
Institution

Ph.D. in Mechanics of Machines

Elastodynamic behaviour of balanced closed-chain mechanisms: numerical and experimental analysis of a four-bar linkage (in Italian – Supervisor: Prof. Alessandro Rivola)

Theory of mechanisms and machines: balancing methods for closed-loop mechanisms
Mechanics of Machines: vibration monitoring of machineries

Alma Mater Studiorum – University of Bologna, DIEM – Department of Mechanical Engineering, Viale del Risorgimento 2, 40136 Bologna (BO), Italy

July 2009

Area
Institution

Mechanical Engineer Certificate – Qualification for professional practice in Italy

Section A – Industrial Area
Alma Mater Studiorum – University of Bologna, Via Zamboni 33, 40126 Bologna (BO), Italy

December 2003 – March 2007

Final grade
Thesis
Main subjects of study
Institution

2nd Level (Master's) Degree in Mechanical Engineering

110/110 cum laude

Analysis and revision of the workflow concerning import-export operations of a multinational company

Mechanics of Machines, Industrial Automation, Robotics, Control Systems, Logistics

University of Bologna - Second Faculty of Engineering, Via Fontanelle 40, 47121 Forlì (FC), Italy

September 2000 – September 2003

Final grade
Thesis
Main subjects of study
Institution

1st Level (Bachelor's) Degree in Mechanical Engineering

110/110 cum laude

Design of a new device for stress-corrosion tests

Mechanics of Machines, Industrial Production Plants, Combustion Engines

University of Bologna - Second Faculty of Engineering, Via Fontanelle 40, 47121 Forlì (FC), Italy

PREVIOUS ACADEMIC POSITIONS

February 2015 – October 2022

Academic discipline

Institution

Main fields of activity

Assistant Professor

Mechanical Engineering – Mechanics of Machines

University of Bologna, DIN – Department of Industrial Engineering, Viale del Risorgimento 2, 40136 Bologna (BO), Italy

Research in the fields of Mechanics and Dynamics of Machines (Vibration monitoring of mechanical systems, flexible multibody dynamics, static balancing of mechanisms) and Vehicle Dynamics (digital twins for vehicle dynamic response, state estimation, parameter identification).
Teaching activity in the field of Mechanics of Machines and Vehicle Dynamics.

July 2011 – June 2014

Institution

Field of investigation

Main activities and responsibilities

Research Fellow

Alma Mater Studiorum – University of Bologna, CIRI – Advanced Applications in Mechanical Engineering & Materials Technology – Viale del Risorgimento 2, 40136 Bologna (BO), Italy

Mechanics of Machines

Research activity concerning the numerical and experimental modelling of components of internal combustion engines for motorcycles

January 2011 – June 2011

Institution

Field of investigation

Main activities and responsibilities

Research Fellow

Alma Mater Studiorum – University of Bologna, DIEM – Department of Mechanical Engineering, Viale del Risorgimento 2, 40136 Bologna (BO), Italy

Mechanics of Machines

Research activity concerning the numerical and experimental analysis of balanced mechanisms

May 2007 – March 2008

Institution

Field of investigation

Main activities and responsibilities

Researcher

University of Ferrara – Engineering Department – Via G. Saragat 1, 44100 Ferrara (Fe), Italy

Mechanics of Machines

Implementation of numerical models for optimizing of the vibration response of a submarine periscope with electric actuators

ACADEMIC ACTIVITY

TEACHING

- 2022 to date: instructor in charge of the teaching of “Industrial Robotics”, for the 2nd cycle degree programme (LM) in Advanced Automotive Engineering (Joint Course among the Universities of Modena and Reggio Emilia, Bologna, Ferrara, Parma)
- 2022 to date: instructor in charge of the teaching of “Laboratory of Dynamics and Vibration of Mechanical Systems” for the 2nd cycle degree programme (LM) in Mechanical Engineering at the University of Bologna
- 2018 to date: instructor in charge of the teaching of “Motorcycle Vehicle Dynamics”, for the 2nd cycle degree programme (LM) in Advanced Automotive Engineering (Joint Course among the Universities of Modena and Reggio Emilia, Bologna, Ferrara, Parma)
- 2014 to date: instructor in charge of the teaching of “Design of automatic machines and robots - Part 2”, for the 2nd cycle degree programme (LM) in Mechanical Engineering at the University of Bologna
- 2008 to date: assistant instructor for a number of teachings relative to the fields of Mechanics of Machines for 1st and 2nd cycle degree programmes in Mechanical Engineering at the University of Bologna

RESEARCH ACTIVITY

SELECTED PUBLICATIONS

- Bonini, F., Rivola, A., Martini, A. (2024). Novel Unscented Kalman Filter-based method to assess the thermal behavior of carbon brake discs for high-performance motorcycles. *International Journal of Thermofluids*, 21: 100547. DOI: 10.1016/j.ijft.2023.100547
- Mottola, G., Martini, A. (2023). A Novel Spatial 3-DoF Constant-Force Generator for the Static Balancing of Parallel Robots. In: Okada, M. (eds) *Advances in Mechanism and Machine Science. IFToMM WC 2023. Mechanisms and Machine Science*, 147. Springer, Cham. DOI: 10.1007/978-3-031-45705-0_73
- Bonini, F., Rivola, A., Martini, A. (2023). Braking torque estimation through machine learning algorithms. *Materials Research Proceedings*, 26, pp. 213–218. DOI: 10.21741/9781644902431-35
- Falcetelli, F., Martini, A., Di Sante, R., Troncossi, M. (2022) Strain Modal Testing with Fiber Bragg Gratings for Automotive Applications. *Sensors*, 22:946. DOI:10.3390/s22030946
- Martini, A., Bonelli, G.P., Rivola A. (2020). Virtual testing of counterbalance forklift trucks: implementation and experimental validation of a numerical multibody model. *Machines*, 8(2):26. DOI: 10.3390/MACHINES8020026
- Troncossi, M., Taddia, S., Rivola, A., Martini A. (2020). Experimental characterization of a high-damping viscoelastic material enclosed in carbon fiber reinforced polymer components. *Applied Sciences*, 10(18):6193. DOI:10.3390/APP10186193
- Martini, A., Troncossi, M., and Rivola, A. (2019). Algorithm for the static balancing of serial and parallel mechanisms combining counterweights and springs: Generation, assessment and ranking of effective design variants. *Mechanism and Machine Theory*, 137, pp. 336-354. DOI:10.1016/j.mechmachtheory.2019.03.031
- Campione, I., Fragassa, C. and Martini, A. (2019). Kinematics optimization of the polishing process of large-sized ceramic slabs. *International Journal of Advanced Manufacturing Technology*, 103(1-4), pp. 1325-1336. DOI:10.1007/s00170-019-03623-3
- Martini, A., Rivola, A., Troncossi, M. (2018). Autocorrelation Analysis of Vibro-Acoustic Signals Measured in a Test Field for Water Leak Detection. *Applied Sciences*, 8(12):2450, pp. 1-15. DOI:10.3390/app8122450
- Martini, A., Bellani, G., Fragassa, C. (2018). Numerical Assessment of a New Hydro-Pneumatic Suspension System for Motorcycles. *International Journal of Automotive and Mechanical Engineering*, 15(2), pp. 5308-5325. DOI:10.15282/ijame.15.2.2018.12.0409
- Martini, A. (2018). Gravity compensation of a 6-UPS parallel kinematics machine tool through elastically balanced constant-force generators. *FME Transactions*, 46(1), pp. 10-16. DOI:10.5937/fmet1801010M
- Martini, A., Troncossi, M., and Rivola, A. (2017). Vibro-acoustic measurements for detecting water leaks in buried small-diameter plastic pipes. *Journal of Pipeline Systems - Engineering and Practice*, 8(4): 04017022, pp. 1-10. DOI:10.1061/(ASCE)PS.1949-1204.0000287
- Martini, A., Troncossi, M., and Rivola, A. (2017). Leak detection in water-filled small-diameter polyethylene pipes by means of acoustic emission measurements. *Applied Sciences*, 7(1):2, pp. 1-13. DOI:10.3390/app7010002
- Martini, A., Troncossi, M., and Vincenzi, N. (2017). Structural and elastodynamic analysis of rotary transfer machines by Finite Element model. *Journal of the Serbian Society for Computational Mechanics*, 11(2), pp. 1-16. DOI:10.24874/jsscm.2017.11.02.01
- Martini, A., Troncossi, M., Rivola, A., and Vincenzi, N. (2017). Experimental vibration analysis of a rotary transfer machine for the manufacture of lock components. In *Proceedings of the Surveillance 9 International Conference*, 22-24 May 2017, Fes, Morocco, pp. 1-9.
- Martini, A., and Troncossi, M. (2016). Upgrade of an automated line for plastic cap manufacture based on experimental vibration analysis. *Case Studies In Mechanical Systems And Signal Processing*, 3, pp. 28-33. DOI:10.1016/j.csmssp.2016.03.002
- Martini, A., Troncossi, M., and Rivola, A. (2015). Automatic Leak Detection in Buried Plastic Pipes of Water Supply Networks by Means of Vibration Measurements. *Shock and Vibration*, vol. 2015, pp.1-13. DOI:10.1155/2015/165304
- Martini, A., Troncossi, M., Carricato, M., and Rivola, A. (2015). Static balancing of a parallel kinematics machine with Linear-Delta architecture: theory, design and numerical investigation. *Mechanism And Machine Theory*, 90, pp.128-141. DOI:10.1016/j.mechmachtheory.2015.03.003
- Martini, A., Troncossi, M., Carricato, M., and Rivola, A. (2014). Elastodynamic behavior of balanced closed-loop mechanisms: numerical analysis of a four-bar linkage. *Meccanica*, 49(3), pp. 601-614. DOI:10.1007/s11012-013-9815-7
- Martini, A., Troncossi, M., Rivola, A., and Nascetti, D. (2014). Preliminary investigations on automatic detection of leaks in water distribution networks by means of vibration monitoring," *Advances in Condition Monitoring of Machinery in Non-Stationary Operations - Lecture Notes in Mechanical Engineering* vol. 5, Springer, pp. 535–544. DOI:10.1007/978-3-642-39348-8_46
- Martini, A., Troncossi, M., and Rivola, A. (2013). Elastodynamic effects of mass-balancing: experimental investigation of a four-bar linkage. *Advances in Mechanical Engineering*, vol. 2013, pp. 1-11. DOI:10.1155/2013/949457

AWARDS AND HONOURS

- Best Case Study Award at the International Conference Surveillance 8, Roanne (France) October 20-21, 2015 (“Experimental vibration analysis of an automatic machine for plastic cap assembly”, by A. Martini, M. Troncosi, A. Rivola).

PROJECT PARTICIPATION

Task Leader for the PNRR M4C2 – Investment 1.4 – Project Mobility “Sustainable Mobility Center” MOST (Code CN00000023 - CUP: J33C22001120001), Spoke 2 (Sustainable Road Vehicle) – WP2 (High efficiency, zero emission powertrain) – Task 2.3 (Functional, performance, mechanical, electrical, and thermal testing for the characterization of fuel-cell based powertrains subsystems).

Principal investigator for the following research/consulting activity funded by a company:

- “State estimation and parameter identification to assess the performance of racing motorcycles through advanced signal processing and analysis of experimental data” – Ducati Motor Holding S.p.A. (Bologna, Italy)
- “Multibody dynamic analysis of the operation of a heavy-duty forklift” – Toyota Material Handling Manufacturing Italy S.p.A. (Bologna, Italy)
- “Stereophotogrammetry measurements on a forklift truck mast during load tests on a tilt-table.” – Toyota Material Handling Manufacturing Italy S.p.A. (Bologna, Italy)
- “Optimization of the driving mechanism of a fixing system for industrial ceiling insulating panels” – STONEX S.r.l. (Monza, MB, Italy)

Involved as investigator for numerous granted research projects, including:

- “Vibration behavior analysis and prediction of a machine tool with rotating table” - Bucci Industries Group (Ravenna, Italy)
- “Experimental Modal Analysis of a Ultralight Helicopter” – Curti Costruzioni Meccaniche S.p.a. (Castel Bolognese, RA – Italy)
- “Vibration measurements and analysis of a prototypal device for cell cultures testing” - Gruppo Villa Maria Care and Research Maria Cecilia Hospital (Ravenna, Italy)
- “Comparative analysis of signals acquired by accelerometers and hydrophones for automatic leak detection in water pipes” - HERA S.p.a. (Bologna, Italy)
- PRRIITT 2008 (Started in August 2009) - "INTERMECH - Laboratory for the Advanced Mechanics. Project: Acoustics and Vibrations (LAV)"
- Regional Industrial Research Project and Pre-competitive development 2006 (Started in January 2008) - "Consolidation, enhancement and validation of a technology platform for vibration and noise control: VIBRACUSTICA". Approved by the Ministry of Education

EDITORIAL ACTIVITY

JOURNAL EDITORIAL BOARD

- Editorial Board Member of the international journal *Advances in Mechanical Engineering* (SAGE Publishing – ISSN: 1687-8140).

PEER-REVIEW

- Peer-reviewer for the following journals: *Journal of Sound and Vibration* (ISSN: 0022-460X); *Mechanical Systems and Signal Processing* (ISSN: 0888-3270); *Shock and Vibration* (ISSN: 1070-9622); *Mechanism and Machine Theory* (ISSN: 0094-114X); *Journal of Mechanisms and Robotics* (ISSN: 1942-4302); *Meccanica* (ISSN: 0025-6455); *Mechanics Based Design of Structures and Machines* (ISSN: 1539-7734); *Structure and Infrastructure Engineering* (ISSN: 1573-2479); *Advances in Mechanical Engineering* (ISSN: 1687-8140); *IEEE/CAA Journal of Automatica Sinica* (ISSN: 2329-9266); *Measurement* (ISSN: 0263-2241); *Sensors* (ISSN: 1424-8220); *Sustainability* (ISSN: 2071-1050); *Information* (ISSN: 2078-2489); *Water* (ISSN 2073-4441); *IEEE Transactions on Industrial Electronics* (ISSN: 0278-0046); *Vibration* (ISSN: 2571-631X); *Energies* (ISSN: 1996-1073); *Applied Sciences* (ISSN: 2076-3417).
- Peer-reviewer for international conferences: IEEE-IROS; ARK; ECCOMAS MBD; CMMNO, IFTOMM World Conference.