Francesco Bucchi

Curriculum Vitae

Personal information

Birth   Pisa, 7 June 1985

Education

2011–2014	**Ph.D. in Mechanical Engineering**, *Università di Pisa*, Italy.
2007–2010	**M.Sc. in Vehicle Engineering**, *Università di Pisa*, Italy, 110/110 with honors.
2004–2007	**B.Sc. in Mechanical Engineering**, *Università di Pisa*, Italy, 110/110.
1999–2004	**Scientific High School Degree**, *Liceo Scientifico "U. Dini" - Pisa*, Italy, 100/100.

Ph.D. Activity

Title   *Smart materials and vehicle efficiency. Design and experimentation of new devices.*

Supervisors   Professor Francesco Frendo & Professor Paola Forte

Thesis date   3 April 2014

Description   The PhD activity dealt with the development of new devices, based on smart materials (i.e. magnetorheological fluids and shape memory alloys), aimed at reducing the energy consumption due to the auxiliary systems in combustion engines. The activity was carried out in the framework of a project funded by Regione Toscana, headed by Pierburg Pump Technolgy - Livorno Plant. Several prototypes of magnetorheological fluid clutch were developed. During the PhD program, three months were spent visiting the *Dynamic and Smart Systems Lab* of the University of Toledo, OH (USA), where a coupling device based on SMA springs was developed and tested.

Publications   The PhD research activity brought to the publication of 7 papers in international journal, 4 papers in international peer rewieved conferences, 4 papers in Italian conferences (see publication list).

Patent   The PhD research activity brought to the publication of 4 international patents (see publication list).

Awards

2014	**Best Paper Award - Juniores Competition**, *Italian Association of Stress Analysis - AIAS Conference*, Rimini, Italy.

2012 **Best Paper Award**, *MSC Simulating Reality - Automotive Users Conference*, Torino, Italy.

Experience

Apr. 2014 – Present **Post-Doc Research Fellow**, Department of Civil and Industrial Engineering (DICI), Università di Pisa, Italy.
Analytical and multibody simulation of vehicle systems in the framework of research activities funded by Yanmar R&D and Leitner Ropeways.

Sep. 2014 – Present **Senior Consultant**, Formula SAE Team, Università di Pisa, Italy.
Vehicle design and dynamic simulation consultant.

Jul. 2013 – Sep. 2013 **Visiting PhD Student**, Dynamic and Smart Systems Lab, University of Toledo, Ohio, USA.
Fatigue behavior of shape memory alloys and development of an actuator based on SMA springs.

Jan. 2011 – Apr. 2014 **PhD Student**, Department of Civil and Industrial Engineering (DICI), Università di Pisa, Italy.
- Development of new devices based on smart materials (magnetorheological clutch and shape memory alloys) aimed at improving the vehicle efficiency.
- Multibody modeling and simulation of vehicles.
- Mechanical behavior of materials. Simulations and experimental activities.

Jan. 2011 – Sep. 2012 **Technical Director**, Formula SAE Team, Università di Pisa, Italy.
Vehicle design supervisor and multibody analyst.

Aug. 2010 – Dec. 2010 **Research Fellow**, Department of Mechanical, Nuclear and Production Engineering (DIMNP), Università di Pisa, Italy.
Analytical and numerical modeling of magnetorheological clutches.

Jun. 2010 – Aug. 2010 **Trainee**, Pierpurg Pump Technology, Livorno Plant, Italy.
Training on vacuum pumps functioning principles.

Research projects with companies

2014 **Università di Pisa – General Electric - Nuovo Pignone**, *Firenze*, Italy.
- Friction tests on specimens and compressor components.
- Development of analytical and numerical models for the assessment of thermo-mechanical stress in turbomachines.

2013–2014 **Università di Pisa – ENI R&D**, *Milano*, Italy.
- Simulation and experimentation of the wear and fatigue behavior of oil-drilling connections.
- Analytical and FE optimization of the cros–section shape of the drill-pipe in oil-drilling.
- Design and FE simulation of a novel drill-pipe tool joint connections.

2012–2014 **Università di Pisa – Leitner Ropeways**, *Bolzano*, Italy.
Multibody simulation of several types of people mover cable train which will be installed in Pisa and in Miami Airport.

2012–2014 **Università di Pisa – Yanmar R&D**, *Firenze*, Italy.
- Kinematic and dynamic analysis of an innovative demolition machine.
- Multibody modeling of a hybrid bulldozer.

2011–2012 **Università di Pisa – Pierburg Pump Technology**, *Livorno*, Italy.
Development of a magnetorheological clutch for the disengagement of engine auxiliaries.

Teaching and academic activities

2011–2014 **Class of Vehicle Design**, *M.Sc. in Vehicle Engineering*, Università di Pisa, Italy.
- Lecture on automatic vehicle transmissions (10 lecture hours per year).
- Supervisor of class exercises on suspension, clutch and gearbox systems (20 exercise hours per year).

2013–2014 **Class of Vehicle and Machine Simulation**, *M.Sc. in Mechanical and Vehicle Engineering*, Università di Pisa, Italy.
- Lecture on multibody modeling of a passenger car (6 lecture hours per year).

2011–2014 **Co-advisor of M.Sc. Thesis**, *M.Sc. in Vehicle Engineering*, Università di Pisa, Italy.
- S. Labianca – *Getting road profile information from the on-board data acquired of a racing car.*
- A. Alba – *Design and optimization of a small–sized demolition machine.*
- L. Paganini – *Telemetry data analyssi of the Formula SAE ET4 car.*
- M. Tartarini – *Development of a dynamic platform for a driving simulator.*
- A. Franceschini – *Development of an experimental benche for the characterization of magnetorheological clutches.*

2011–2014 **Co-advisor of B.Sc. Thesis**, *B.Sc. in Mechanical Engineering*, Università di Pisa, Italy.

Co-advisor of 9 theses dealing with the simulation and the design of vehicle components and systems.

Software skills

Basic LabVIEW, AutoCAD

Intermediate Ansys, SolidWorks, MATLAB-Simulink

Advanced Wolfram Mathematica, MSC Adams

Communication Skills

2011–2014 Conference speaker in 4 international conferences and 4 Italian conferences.

Lecturer in 2 Classes at the University of Pisa.

Languages

Italian **Mothertongue**

English **Good - B2 Level Certification** *Speaking fluent, advanced in reading and writing.*

French **Basic** *Basic words and phrases only*