

# Curriculum Vitae

## Personal information

First name(s) / Surname(s) **Francesco Magaletti**

Address(es)

Telephone(s)

E-mail

Nationality Italian

Date of birth

Place of birth

Gender Male

## Work experience

Starting date 01 May 2015

Occupation or position held **Two year postDoc position funded by the ERC Advanced Grant No. 339446, "Cavitation across scales: following Bubbles from Inception to Collapse (BIC)"**

Name and address of employer Department of Mechanical and Aerospace Engineering, Sapienza Università di Roma, Italy

Type of business or sector University

Main activities and responsibilities

- Research on the diffuse interface modeling of bubble dynamics and cavitation phenomena
- PhD Supervision
- Master's degree thesis Supervision

Starting date 01 November 2014 – 30 April 2015

Occupation or position held **Six Month scholarship funded by the ERC Advanced Grant No. 339446, "Cavitation across scales: following Bubbles from Inception to Collapse (BIC)"**

Name and address of employer Department of Mechanical and Aerospace Engineering, Sapienza Università di Roma, Italy

Type of business or sector University

Main activities and responsibilities

- Research on the diffuse interface modeling of vapor bubble collapse near wall
- PhD Supervision
- Master's degree thesis Supervision

## Education and training

Date 01 November 2011 – 30 January 2015

Title of qualification **PhD in Theoretical and Applied Mechanics**

Affiliation Dep. Of Mechanical and Aerospace engineering , University Sapienza – Rome, Italy

Thesis' title Diffuse interface modeling of droplet dynamics and liquid-vapor phase transitions

Thesis' description Theoretical and numerical analysis of interfacial problems, binary and multiphase flows. The diffuse interface approach have been adopted to deal with the multiscale nature of both non-miscible liquid-liquid and vapor-liquid flows. A generalized framework has been derived with a multi-species, two-phase fluid system and several numerical codes, based on finite difference schemes, have been developed to analyze the droplet dynamics on a vibrating plate and the collapse dynamics of a cavitation vapor bubble.

Coursework / Seminars

- Analytical Continuum Mechanics – Prof. F. Dell'Isola
- Homogenization techniques – Prof. Amar
- Cahn-Hilliard equation – Prof. Fusco
- High performance computing – Caspur (Rome)
- GPU programming – Caspur (Rome)
- Parallel computing with MPI and OpenMP – Caspur (Rome)

Date	January 14 <sup>th</sup> 2011
Title of qualification	<b>Master's degree in Aeronautical engineering</b>
Grade	110 /110 Magna cum laude
Thesis' title	Wetting and surface tension effects on binary fluids
Thesis' description	Numerical analysis of binary mixture flows (driven cavity, droplet break-up, capillary waves) using the diffuse interface Cahn-Hilliard model coupled to Navier-Stokes equations. Aim of the thesis work is the development of a finite difference code to solve the system of equations and the analysis of the effect of surface tension on unbounded binary flows (i.e. droplet break-up under shear condition) and the effect of wetting properties (i.e. contact angle, wall-relaxation time) on bounded binary flows (i.e. binary driven cavity).
Principal subjects	<ul style="list-style-type: none"> <li>• Micro-nano fluidics and micro-nano devices</li> <li>• Computational aerodynamics and gasdynamics</li> <li>• Combustion</li> <li>• Turbulence</li> <li>• Aeroelasticity</li> <li>• Experimental aerodynamics</li> <li>• Gasdynamics</li> <li>• Aeronautical structures</li> <li>• Aircraft propulsion</li> <li>• Dynamics of flight</li> <li>• Linear control of dynamic systems</li> <li>• Air-traffic control</li> <li>• Aircraft aerodynamic design</li> </ul>
Other courseworks / seminars	<ul style="list-style-type: none"> <li>• <i>Bio and micro fluidics coursework</i>, Prof. Howard A. Stone</li> <li>• <i>Inertial particles in turbulent flows</i>, Prof. Massimo Cencini</li> </ul>
University	University Sapienza - Rome
Instrumentation experience	<ul style="list-style-type: none"> <li>• Hot wired anemometry</li> <li>• Laser Induced fluorescence</li> <li>• Particle image velocimetry</li> </ul>
CFD experience	<ul style="list-style-type: none"> <li>• Finite difference method applied to Navier-Stokes + Cahn-Hilliard system of equation for binary fluids, with own-written codes</li> <li>• Fundamental of computational methods for shock capturing in supersonic flows</li> <li>• Use of NAMD software for molecular dynamics</li> </ul>
Date	September 15 <sup>th</sup> 2008
Title of qualification	<b>Bachelor's degree in Aerospace engineering</b>
Grade	110/110 Magna cum laude
Thesis' title	Physical features of fuel evaporation in internal combustion engine's intake pipe.
Thesis' description	Numerical analysis with a DNS code of a turbulent pipe with inertial rigid particle. A simple model of evaporation is adopted coupling a passive scalar vapour concentration field to the incompressible Navier-Stokes equations. Aim of the thesis is to develop a simple model of particle collision and coalescence and to analyse the effect of the coalescence on the evaporation length and on the statistical radius distribution of the particles.
Principal subjects	<ul style="list-style-type: none"> <li>• Aerodynamics</li> <li>• Flight mechanics</li> <li>• Aerospace propulsion</li> <li>• Aerospace structures</li> <li>• Numerical methods and Basics of computational fluid dynamics</li> <li>• Materials for aerospace</li> <li>• Applied Mechanics</li> </ul>
University	University Sapienza - Rome

CFD experience

- DNS on turbulent pipe with inertial particle
- CFD++ software

## Publications

Sartori, P., Quagliati, D., Varagnolo, S., Pierno, M., Mistura, G., Magaletti, F., & Casciola, C. M. (2015). *Drop motion induced by vertical vibrations*. *New Journal of Physics*, 17(11), 113017.

F. Magaletti, L. Marino and C.M. Casciola (2015). *Shock formation in the collapse of a vapor nano-bubble*. *Physical Review Letters*, 114 (6), 064501

M. Pourali, S. Meloni, F. Magaletti, A. Maghari, C.M. Casciola and G. Ciccotti (2014). *Relaxation of a steep density gradient in a simple fluid: comparison between atomistic and continuum modeling*. *The Journal of Chemical Physics*, 141 (15), 154107

F. Magaletti, F. Picano, M. Chinappi, L. Marino and C. M. Casciola (2013). *The sharp-interface limit of the Cahn–Hilliard/Navier–Stokes model for binary fluids*. *Journal of Fluid Mechanics*, 714, pp 95-126  
doi:10.1017/jfm.2012.461

## Funding and Grants

Sapienza Funding - Avvio alla Ricerca 2015

National CINECA Grant ISCRA C (1million core-hours)

Sapienza Funding - Avvio alla Ricerca 2013

Sapienza Funding - Avvio alla Ricerca 2012

## Conferences

F. Magaletti, L. Marino, C. Casciola – A diffuse interface approach to study the pressure-induced collapse of a vapor bubble – 10<sup>th</sup> Euro FluidMechanics Conference – Copenhagen, Denmark, September 14-18 2014

F. Magaletti, L. Marino, C. Casciola – *The diffuse interface model as a tool to numerically investigate vapor bubble dynamics* – XXI congresso Aimeta – Torino, Italy, September 17-20 2013

F. Magaletti, F. Picano, M. Chinappi, L. Marino, C. Casciola - *Fast time relaxation and dissipation in a Cahn-Hilliard binary fluid system*- 9<sup>th</sup> Euro FluidMechanics Conference – Rome, Italy, September 9-13 2012

F. Picano, F. Magaletti, M. Chinappi, L. Marino, C. Casciola - *Cahn-Hilliard model for the simulation of unsteady binary flows* – XX Conference AIMETA 2011, Bologna, Italy, September 12-15 2011

F. Magaletti, F. Picano, M. Chinappi, L. Marino, C. Casciola- *Diffuse interface methods for unsteady binary flows: the role of mobility* - 7<sup>th</sup> International Conference on Computational Heat and Mass Transfer – Yeditepe University, Istanbul, Turkey, July 18-21 2011

## Languages

Native speaker of italian

European level(\*)

**English**

Understanding listening

B2

Understanding reading

C1

Spoken interaction

B2

Spoken production

B2

Writing

C1

(\*) *Common European framework of reference for languages*

## Other skills

Organisational skills and competences

In 2005-2006 I've joined the university team *Uniracer* where I've played an active role in organizing courseworks, eg. *"Drive through"* on aerodynamic of racing cars, and in organizing an amateur karting contest.

Computer skills and competences

- Main programming language C
- Other programming languages CUDA-C, Fortran 90, Matlab, PHP
- Good knowledge on Mathematica, LaTeX, Tecplot, Gnuplot

Honors and achievements

- Basic knowledge on CFD++, OpenFoam, NAMD software
- I can work on UNIX and Windows operating system
- Winner of “Turing machine programming” competition in 2004 and 2005 , University of Pisa

**Annexes** none