Curriculum Vitæ
Diego Angeli, Ph.D.

Personal Details

Place of birth. Modena, Italy

Date of birth. October 15, 1981

Nationality. Italian

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Synopsis

I am a Master of Science in Mechanical Engineering and Ph.D. in Automotive Design and Technology. Currently I hold a three-year position as Assistant Professor at the Department of Sciences and Methods for Engineering (DISMI), of the University of Modena and Reggio Emilia, Italy.
I am actively performing research in the field of Applied Physics, with particular reference to convection heat transfer. I developed a specific expertise in the devising of computational methods and codes for thermo-fluid dynamics, and in the application of open source CFD tools to the analysis of complex industrial systems. I also gained experience in the use of of velocity and temperature measurement techniques. I participated in several national and international research projects. I am author of more than 30 publications at an international or national level, including 10 international journal papers.
Since 2006 I have taught classes in the frame of courses related to thermodynamics, fluid dynamics and heat transfer at the University of Modena and Reggio Emilia.

Educational Qualifications

Ph.D. in Automotive Design and Technology. Ph.D. School in "High Mechanics and Automotive Design and Technology" University of Modena and Reggio Emilia, Apr. 2009
Thesis title: "Transitional Natural Convection in Enclosures".
Supervisor: Prof. Giovanni S. Barozzi.

Degree in Mechanical Engineering. University of Modena and Reggio Emilia, Dec. 2004
Thesis title: "Direct numerical simulation of transitional confined buoyancy-induced flows".
Supervisor: Prof. Mauro A. Corticelli.
Final mark: 110/110

High School Diploma. Liceo Scientifico Alessandro Tassoni, Modena, Italy, Jul. 1999
Final mark: 100/100

Academic and professional experience

May 2013 - now. *Assistant Professor*
Hosting structure: DISMI - Department of Sciences and Methods for Engineering, University of Modena and Reggio Emilia.

August 2010 - April 2013. *Post-Doc Fellow*
Hosting structure: DIEF - Department of Engineering "Enzo Ferrari", University of Modena and Reggio Emilia.
Research title: "Development of DNS techniques for the study of low-Prandtl natural convection flows around tube bundles. Development and implementation of an Arbitrary Lagrangian-Eulerian algorithm for the numerical simulation of two-phase flows."
Supervisor: Dr. Enrico Stalio.
Funding: EU FP7 THINS project.

June 2010 - now. *R&D collaborator* and shareholder @ mimesis s.r.l. (`www.mimesis.eu`)

January 2009 - June 2010. *Post-Doc Fellow*
Hosting structure: DIMeC - Department of Mechanical and Civil Engineering, University of Modena and Reggio Emilia.
Research title: "Development and testing of computational methods for road vehicle aerodynamics applications"
Supervisor: Prof. Mauro A. Corticelli.
Funding: INTERMECH Project, Emilia Romagna region.

June 2007 - March 2010. *R&D collaborator*
Hosting structures: C.E.R.N. (Organisation Europeenne pour la Recherche Nucleaire), Geneve (Switzerland); A.A.A. (Advanced Accelerator Applications), Saint-Genis-Pouilly (France).
Research topic: Development of CFD methods for the simulation of liquid metal free surface flows in nuclear spallation targets.
Supervisor: Dr. Luca Maciocco
Funding: EU FP6 EUROTRANS project.

January 2006 - March 2009. *Ph.D. student.*
Ph.D. School: "High Mechanics and Automotive Design and Technology", University of Modena and Reggio Emilia.
Research theme: Numerical simulation of transitional natural convection flows from enclosed heat sources.
Supervisor: Prof. Giovanni S. Barozzi.
Funding: MIUR - Ministero dell'Università e della Ricerca, Repubblica Italiana.
Reference projects: PRIN 2005, PRIN 2008 (PROTERM) national projects

March 2005 - December 2005. *SPINNER Technology Transfer Grant.*
Hosting structure: DIMeC - Department of Mechanical and Civil Engineering, University of Modena and Reggio Emilia.
Research title: "Development of an industrial preheating system by a confined flame".
Supervisor: Prof. Giovanni S. Barozzi.
Funding: Emilia Romagna Region - ESF (European Social Fund).
Partner: GE.PR.IN. (GEstione PRocessi INdustriali) s.r.l., Modena, Italy

Research

Research interests

- Natural convection flows in totally or partially confined domains, containing heat sources, in transitional and turbulent regimes
- Non-linear dissipative dynamical systems: identification of routes to chaos in thermo-fluid systems
- Computational physics:
  - development of high-performance computational codes for Direct Numerical Simulation (DNS) of transitional and turbulent flows;
  - develompent of algorithms for the reconstruction of irregular domains on Cartesian grids;
  - development of CFD methods of single- and two-phase flows based on moving grids, for applications in the field of thermal-hydraulics of nuclear systems;
  - development of simplified models for the analysis of complex thermo-fluid systems;
  - 3D CFD modeling of complex thermo-fluid systems with *open source* tools
- Aeraulics of road tunnel ventilation systems
- Liquid-solid interaction and capillarity
- Innovative aeronautic propulsion systems

Participation in research projects

- Italian national PRIN 2005 project: "Study and optimization of thermogravitationally controlled systems". Coordinator: Prof. Giovanni S. Barozzi, University of Modena and Reggio Emilia, Italy.
- Italian national PRIN 2008 project: "Prediction, enhancement and optimization of complex fluid-dynamic regimes in thermogravitationally controlled systems (PROTERM)". Coordinator: Prof. Giovanni Tanda, University of Genoa, Italy.
- C.E.R.N. - I.N.F.N. "MODULAr" project (Coordinator: Prof. Carlo Rubbia, C.E.R.N.)
- EU FP6 "EUROTRANS (EUROpean research programme for the TRANSmutation of high level nuclear waste in accelerator driven systems)" project. Leader: Forschungszetrum Karlsruhe (FZK), Germany
- EU FP7 "THINS (Thermal-Hydraulics of Innovative Nuclear Systems)" project. Leader: Karlsruhe Institute of Technology (KIT), Germany.
- Research project "Analysis and optimization of the Mont Blanc tunnel Ventilation system" (collaboration between University of Modena and Reggio Emilia and GEIE-TMB). Coordinator: Prof. Giovanni S. Barozzi.
- EU FP7 "MAAT (Multibody Advanced Airships for Transport)" project. Leader: University of Modena and Reggio Emilia.
- EU FP7 "ACHEON (Aerial Coanda High-Efficiency Orienting jet Nozzle)", project. Leader: University of Modena and Reggio Emilia, Italy.
- EU FP7 "CROP (Cycloidal Rotor Optimized for Propulsion)" project. Leader: University of Beira Inferior, Covilha, Portugal.

Scientific Collaborations

- C.E.R.N. (Organisation Europeenne pour la Recherche Nucleaire, research institute, Switzerland)
- University of Catania (Italy)
- Brunel University (U.K.)
- A.A.A. (Advanced Accelerator Applications, private company, France)
- University of Lagos (Nigeria)
- University of Soochow (China)
- University of L'Aquila (Italy)
- University of Basilicata (Italy)
- P.S.I. (Paul Scherrer Institut, research institute, Switzerland)
- CINECA High-Performance Computing Consortium (Italy)

Affiliations and honors

I am member of the American Society of Mechanical Engineering (ASME) and of the Italian Union on Thermo-fluid Dynamics (UIT).
My Ph.D. Thesis "Transitional Regimes of Natural Convection in Enclosures" has received a mention of honor in the UIT prize for Best Ph.D. Thesis for the term 2009-2010.

Peer reviewing activity

Since 2010, I have acted as peer-reviewer for the following international journals:

- Fluid Dynamics & Materials Processing
- Heat Transfer - Asian Research
- Heat Transfer Engineering
- International Journal of Heat and Mass Transfer
- International Journal of Thermal Sciences
- Nuclear Engineering and Design
- Water Research

Teaching

Academic teaching

2006 - 2013 *Faculty of Engineering, University of Modena and Reggio Emilia.*

- Laboratory lectures for the Computational Thermo-fluid Dynamics course, in the frame of the Master Courses of Mechanical Engineering and Vehicle Engineering. The lectures include training sessions of several software tools, such as the MATLAB environment and the open source CFD package OpenFOAM.
- Exercise classes for the Applied Physics course, in the frame of the Bachelor Courses in Mechanical and Civil Engineering.
- Assistance, supervisioning and participation to the exam committee for the aforementioned courses.
- Co-advisor of several Bachelor and Master theses in the field of Applied Physics.

2010 - now *Interuniversity course with the Univerisity of the Republic of San Marino*

- Exercise classes for the Applied Physics course, in the frame of the Bachelor Course in Civil Engineering.

2013 - now *Department of Sciences and Methods for Engineering, University of Modena and Reggio Emilia*

- Exercise classes and lectures for the Applied Physics course, in the frame of the Bachelor Course in Management Engineering.

Invited seminars

2013 *University of Catania - Department of Industrial Engineering*

- **Date:** October 22, 2013
  Title: Natural convection: theory, modeling and applications.

2013 *TU Delft - Department of Hydro- and Aerodynamics, Delft (The Netherlands)*

- **Date:** June 10, 2013
  Title: Natural convection from an enclosed horizontal cylinder: nonlinear dynamics and bifurcating flow structures.

2012 *LIMSI - Laboratoire d'Informatique pour la Mécanique et les Sciences de l'Ingénieur, Orsay (France)*

- LIMSI- FAST Seminar
  Date: November 8, 2012
  Title: Natural convection from an enclosed horizontal cylinder: nonlinear dynamics and bifurcating flow structures.

2012 *U.I.T. - Unione Italiana Termofluidodinamica*

- 12^{th} U.I.T. Summer School, "Computational Fluid Dynamics"
  Date: September 14, 2012
  Title: A crash course in OpenFOAM.

2010 *PSI - Paul Scherrer Institut, Villigen (Switzerland)*

- LTH Seminar
  Date: March 11, 2010
  Title: A fast Cartesian scheme for unsteady natural convection in irregular domains.

Supervising activity.

Throughout the years I co-supervised about fifteen undergraduate students during their bachelor or master thesis work period, whose projects covered several different branches of Applied Physics, ranging from natural convection to ventilation of road tunnels, from capillarity to wind energy.

Participation to conferences and training courses

Participation to conferences and workshops

- 5th International Conference (CHAOS2012) on Chaotic Modeling, Simulation and Applications, Athens (Greece), 11-14 June 2012. Chairman of the session on "Flows and Convection" and presenting author.
- 30th UIT National Heat Transfer Conference, Bologna (Italy), 25-27 June 2012, presenting author.
- 29th UIT National Heat Transfer Conference, Torino (Italy), 20-22 June 2011, presenting author.
- 4th International Conference (CHAOS2011) on Chaotic Modeling, Simulation and Applications, Agios Nikolaos (Greece), 30 Maggio - 3 June 2011, presenting author.
- 14th International Heat Transfer Conference (IHTC14), Washington D.C. (USA), 8-13 August 2010, presenting author.
- 28th UIT National Heat Transfer Conference, Brescia (Italy), 21-23 June 2010, presenting author.
- 27th UIT National Heat Transfer Conference, Reggio Emilia (Italy), 22-24 June 2009, presenting author.
- 3rd OpenFOAM Workshop, Politecnico di Milano (Italy), 9-11 July 2008.
- 25th UIT National Heat Transfer Conference, Trieste (Italy), 18-20 June 2007, presenting author.
- 24th UIT National Heat Transfer Conference, Napoli (Italy), 19-21 June 2006, presenting author.
- 23rd UIT National Heat Transfer Conference, Parma (Italy), 20-22 June 2005, presenting author.

Continuing Education

"Python for scientific computing". (Mar. 2012)
Held at CILEA, Milano, Italy.

ANSYS Training Course "ANSYS DesignModeler 12.1 and ANSYS Meshing 12.1". (Feb. 2010)
Held at ANSYS Italia, Milano, Italy.

8th U.I.T. Summer School, "Natural Convection: basics, techniques, applications". (Sep. 2008)
Held at the Certosa di Pontignano, Siena, Italy.

"An introduction to Lattice Boltzmann Methods for complex flow simulations". (Mar. 2008)
Held at the C.N.R., Consiglio Nazionale delle Ricerche, Rome, Italy.

Lecture Series "Thermo-Hydraulic Instabilities". (Nov. 2006)
Held at the Von Karman Institute For Fluid Dynamics, Bruxelles, Belgium.

6th U.I.T. Summer School, "Computational Fluid Dynamics". (Sep. 2006)
Held at the Certosa di Pontignano, Siena, Italy.

Lecture Series "Grid Generation Techniques". (Nov. 2005)
Held at MOX, Politecnico di Milano, Milano, Italy.

Lecture Series "Introduction to Measurement Techniques". (Oct. 2005)
Held at the Von Karman Institute For Fluid Dynamics, Bruxelles, Belgium.

5th U.I.T. Summer School, "Thermo-fluid dynamics of turbulent flows". (Sep. 2005)
Held at the Certosa di Pontignano, Siena, Italy.

14th Summer School on Parallel Computing. (Jul. 2005)
Held at CINECA, Bologna, Italy.

Lecture Series "Computational Fluid Dynamics". (May 2005)
Held at MOX, Politecnico di Milano, Milano, Italy.

Institutional and organizational roles

- Elected representative of Post-Doc research fellows in the Board of Department of the Dipartimento di Ingegneria "Enzo Ferrari" (DIEF), University of Modena and Reggio Emilia, for the academic year 2012-2013.
- Elected representative of Ph.D. students in the Board of Department of the Dipartimento di Ingegneria Meccanica e Civile (DIMeC), University of Modena and Reggio Emilia, for the academic year 2008-2009.
- Responsible of the HPC facilities of the LIFT (Laboratorio Intermech di Fisica Tecnica) laboratory, University of Modena and Reggio Emilia (2010-2013).
- Co-organizer of the 5th AIGE (Italian Association of Energy Management) Conference, Modena, Italy, June 2011.
- Co-organizer of the THINS 2014 International Workshop, Modena, Italy, January 2014.

Technical skills

- **Computational Fluid Dynamics.** OpenFOAM, ANSYS Fluent, CD-Adapco Star-CD.
- **Programming languages, HP computing.** Fortran 90/95, Python, MATLAB, C/C++, use of most widely known numerical libraries, parallel computing frameworks (MPI, OpenMP).
- **Measurement techniques in fluid dynamics.** PIV (Particle Image Velocimetry), IR thermography, classical velocity and temperature measurement techniques. Design of innovative test facilities for *in situ* air velocity measurements in road tunnels.
- **IT system administration.** GNU/Linux e Windows OSes, basic setup and management of networks and computing clusters.
- **Productivity and Graphics software.** Microsoft Office, LaTeX 2_ε, GIMP, Inkscape.

Language skills[1]

	Comprensione		**Parlato**		**Scritto**
	Listening	Reading	Spoken interaction	Spoken production	Writing
English	C2	C2	C2	C2	C2
German	B1	B2	B1	B1	B2
French	A2	A2	A2	A2	A2

Modena, April 28th, 2014

Diego Angeli

[1] self-assessment based on the Common European Framework of Reference (CEF):
A1/A2 - Basic user
B1/B2 - Independent user
C1/C2 - Proficient user