Prof. Dr. Andrea De Pascale

Age:	Born in Italy, January 7th, 1976
Office Mailing Address:	Università di Bologna - Dept. of Industrial Engineering (DIN), viale risorgimento 2, 40136, Bologna, Italy
Contacts:	Tel: +30 051 2093310 e-mail: andrea.depascale@unibo.it

CURRENT POSITION

Associate Professor (Academic discipline: ING-IND/08 Fluid Machinery) at the University of Bologna – Dept. of Industrial Engineering (DIN), since Sept. 2017.

PREVIOUS POSITIONS

- (2010-2017) Assistant Professor at the University of Bologna.
- (2009-2010) Senior post-doc at the University of Bologna on the subject of micro-CHP energy systems.
- (2007-2008) Senior post-doc at the University of Bologna on the subject of numerical simulation of combustion for micro gas turbines with syngas fuels.
- (2005-2007) Post-doc at ENEA on the subject of integration of advanced energy systems into district heating networks, financed by “Laboratorio ERG - ER region”.
- (2002-2004) PhD student. During the phD he spent one year at the ALSTOM Power Research Center, in Switzerland, working in the CFD and Combustion Team, on modelling NOx formation in gas turbines.
- (2002) Research Fellowship by “Consorzio Spinner - ER region” on fuel cell energy systems.
- (2001) Trainee at ALSTOM Power Research Center, Switzerland, Team for Aerodynamic Design of gas turbines.

EDUCATION AND PROFESSIONAL TITLES

- 2000 - Master Degree “cum laude” in Mechanical Engineering, University of Bologna.
- 2000 - Professional Qualification, Mechanical Engineer.
- 2005 - Ph.D. in Fluid Machinery and Energy Systems, University of Bologna; PhD thesis title: “Combustion and NOx formation modelling in DLN burners for industrial gas turbines”.
- 2012 - National Scientific Qualification, role Associate Professor, 09/C1 (Fluid Machinery, Systems for Energy and Environment).
- 2020 - National Scientific Qualification, role Full Professor, 09/C1 (Fluid Machinery, Systems for Energy and Environment).

TEACHING ACTIVITY

- Professor of: “Environmental Impact of Energy Systems”, “Advanced Energy Systems and Cogeneration” and “Fluid Power Systems” in Mechanical and Energy Engineering master courses.
- Member of the Academic Board and vice-coordinator of the Ph.D. Program: Mechanics and Advanced Engineering Sciences (DIMSAI). Admission Board in 2013, 2017, and 2019.
- Lecturer for the Ph.D. program “Future Earth, Climate Change and Societal Challenges”.
- Member of the scientific committee for the II-level Master course in Energy Management.
- Member of the quality assurance committee for the course in Energy Engineering.

MAIN SCIENTIFIC AREAS

1. Applied Thermodynamics and Fluid Machinery.
2. Conventional energy systems: Gas/Steam Turbines and Combined Cycles.
3. Advanced energy systems: Waste-to-Energy, Combined Heat and Power, Waste-Heat Recovery, Organic Rankine Cycles and Machines.
4. Renewable energy systems: Solar, Wind, Geothermal, Biofuels, and Hybrid power plants.
5. Energy storage: Power-to-Gas, Hydrogen based energy conversion and storage.
6. Low-temperature energy systems: refrigerants, cryogenic cycles, and machines, gas liquefaction.

7. Energy system networks: District Heating, mini-grids, integrated energy systems.
8. Fluid Power and volumetric machines.

CURRENT RESEARCH

He is currently working within the Energy System Group of DIN, where he coordinates both numerical and experimental research activities. His main scientific focus deals with the thermodynamics of advanced energy systems, micro-CHP and Waste Heat Recovery systems; he is involved in projects on renewable, low-CO2 and storage solutions based on H2 and on low-temperature WHR technologies.
At UNIBO he is responsible of the "Laboratory of Technologies for Micro-CoGeneration", within CIRI-FRAME (UniBo Interdepartmental Industrial Research Center on Renewables, Environment, Sea and Energy). Within this lab, research is currently carried out by implementing test benches and developing numerical and experimental studies on micro-generators, volumetric expanders, pumps and fluids with special reference to the ORC technology.

SCIENTIFIC OUTCOMES AND AWARDS

- Author of more than 100 scientific publications in international Journals and Congresses.
- ORCID ID: http://orcid.org/0000-0003-4963-340X
- Current Citations (Scopus DB): 1944; H-index: 23.
- "John P. Davis Award 2015" by the ASME, for a study on gas turbines, selected among 1051 papers of that year, "in recognition of the technical paper that most significantly describes new or continuing gas turbine applications… and is judged, therefore, to be of exceptional value to others supplying or using gas turbines and their support systems".
- "Best Application Paper Award", Industrial and Cogeneration Committee of the ASME-IGTI, for a paper presented at the ASME Turbo Expo 2005.
- "Best Technical Paper Award", I&C Committee of the ASME-IGTI, for a paper presented at the ASME Turbo Expo 2008.
- "Best Paper Award", I&C Committee of the ASME-IGTI, for a paper presented at the ASME Turbo Expo 2015.
- "Outstanding Review Award", Journal Applied Energy, in 2013.
- Editorial Board Member for the peer-reviewed open-access journal "Energies", since 2019.
- Member of the Scientific Advisory Board for the international congress SDEWES series.

RESEARCH PROJECTS PARTICIPATION

- (2020-21) PI of the scientific contract with CNR (DIITET) in the framework of National RdS, AdP MSE-CNR 2019-2021: "Analisi delle prestazioni energetiche del sistema P2G complessivo, in condizioni di input elettrico variabile"; "Analisi termo-economica del sistema P2G complessivo, eventualmente integrato con sistemi di restituzione, ed in scenari di applicazione con input elettrico variabile".
- (2018) PI of the scientific contract with CNR (DIITET), National RdS, AdP MSE-CNR, PAR 2016-17: "Completion of thermodynamic investigations to evaluate the performance of a P2G energy storage system powered by renewable sources and its application to natural gas infrastructures".
- (2017) PI of the scientific contract with CNR (DIITET), National RdS, AdP MSE-CNR, PAR 2015 : "Development of a calculation model for the analysis of the performance of a P2G energy storage system powered by renewable sources".
- (2014-16) PI of the scientific contract with CNR (DIITET), National RdS, AdP MiSE-CNR, PAR 2013-14: "Performance analysis of an Energy Storage System based on Renewable Energy".
- (2012-14) PI of the scientific contract with CNR (DIITET): "Thermal integration of ZEBRA battery and high temperature fuel cell", National RdS, AdP MiSE-CNR, PAR 2011-12.
- Scientific collaboration with ENEA: "Analysis of strategies for the optimized management of complex thermal energy distribution networks", National RdS, AdP MiSE-CNR, PAR 2015.
- Scientific collaboration with ENEA: "Analysis of design solutions for the transformation of existing TLR networks into polygenerative networks with active exchange", National RdS, AdP MiSE-CNR, PAR 2013-14.

- Research project: "Pilot programme for the experimental development of hydrogen technologies for early markets and decarbonisation", Agreement with Ravenna-ITALY municipality, 2011-12.
- Scientific collaboration with CNR (ITAE): “Definition of guidelines for the design of thermal integration between the ZEBRA electrochemical storage system and the IT-SOFC power generation system”, National RdS, AdP MSE-CNR, PAR 2009-10.
- Scientific collaboration with CNR (ITAE): “Performance analysis of complex electricity and heat generation systems for households using accumulators operating at high temperature”, National RdS, AdP MSE-CNR, PAR 2008.

COMPETITIVE RESEARCH PROJECTS PARTICIPATION

- H2020 Project “ZEHTC - Zero Emission Hydrogen Turbine Center”, ERA-Net Smart Energy Systems, EN SGplusRegSys, 2019-21.
- Regional Project “CLEANPORT – Study and design of LNG systems on board of ships” 2016-18 funded by POR-FESR 2014-20.
- Regional Project PREPAIR LIFE15 IPE IT 013.“Action C15, aimed at improving the energy efficiency of the industrial sector” 2020-21.
- Regional Project “EFFICITY – Efficient energy systems for smart urban districts” 2017-2018 funded by POR-FESR 2014-2020.
- Regional Project “FRIMAG – Development of a refrigerator prototype for food storage” 2017-18 funded by POR-FESR 2014-2020.
- Institutional Grant: Funding of basic research activities (FFABR 2017, ANVUR n. 20/2017).
- National Research Project PRIN 2008 prot. 2008X733PJ_002, on the topic of biogas derived syngas combustion in micro-turbines.
- National Research Project PRIN 2007 prot. 2007RW9A3Z, on the topic of distributed micro co-generation.
- National Research Project PRIN 2006 prot. 2006098398_003, on the topic of simulation and test of a microturbine fed with syngas.

RECENT RESEARCH AND TECHNOLOGICAL TRANSFER PROJECTS PARTICIPATION

- 2018/20 –Solar Turbines International Company; topic: natural gas compression stations, with GTs and waste heat recovery, using electric motor generators.
- 2013/20 - Turboden company (Mitsubishi Heavy Industries group); topic: ORC application to NG compression stations; several papers produced.
- 2018 - Alma Petroli SpA; study on the internal heat distribution line.
- 2017 - Watson Cogeneration, TESORO Corp., USA; "Water Injection Evaporation in Frame 7EA Gas Turbine Wrapper".
- 2016 - GRAF SpA (oil & gas division); topic: fluid machines for cryogenic applications, POR-FESR 2014-2020.
- 2016 - FAM-ENI; topic: electric generation from renewable on board of off-shore platforms in the Adriatic sea.
- 2015 - Ferrari Tech. SpA; “Feasibility study of a thermodynamic process for the production of LNG by turboexpansion of compressed gas”.
- 2013 - FAM-HERA SpA; “Integration of the thermal cycle of a waste-to-energy plant and a gas/steam combined cycle”.

OTHER INFOS

- Expert reviewer for Horizon 2020, European Commission, since 2013.
- Member of REPRISE, Register of Expert Peer-Reviewers for Italian Scientific Evaluation.
- Scientific Expert for RdS (MiSE), 2020.
- Member of the Editorial Board of the MDPI Open Access Journal “Energies” (Topic: Thermal Management).
- Referee for Journals, e.g.: Applied Energy; Energy; Energy Conversion and Management; Applied Thermal Engineering; Energies; Entropy; J. of Fuel Cell Sci. & Tech.; J. of Power Sources.

- Referee for Postdoctoral Fellowship admission at the Research Foundation - Flanders (FWO), 2017.
- Member of the PhD Final Assessment Committee at the Technical University of Denmark (DTU), Dep. of Mech. Engineering, 2019.
- ASME Member and IGTI Committees: Industrial & Cogeneration; Oil & Gas Applications.

MOST RELEVANT AND RECENT PUBLICATIONS

1. M.A. Ancona, M. Bianchi, L. Branchini, F. Catena, A. De Pascale, F. Melino, A. Peretto. *Numerical prediction of off-design performance for a Power-to-Gas system coupled with renewables*. Energy Conversion and Management 2020, 210, 15 April 2020. DOI: 10.1016/j.enconman.2020.112702
2. M. Bianchi, L. Branchini, A. De Pascale, F. Melino, S. Ottaviano, A. Peretto, N. Torricelli. *Application and comparison of semi-empirical models for performance prediction of a kW-size reciprocating piston expander.* Applied Energy, 249 (2019) 143-156
3. M.A. Ancona, V. Antonucci, L. Branchini, F. Catena, A. De Pascale, et al. *Thermal integration of a high-temperature co-electrolyzer and experimental methanator for Power-to-Gas energy storage system.* Energy Conversion and Management 186 (2019) 140–155. doi: 10.1016/j.enconman.2019.02.057
4. M. Bianchi, L. Branchini, A. De Pascale, F. Melino, A. Peretto, D. Archetti, F. Campana, T. Ferrari, N. Rossetti. *Feasibility of ORC application in natural gas compressor stations.* Energy, Volume 173, 15 April 2019, Pages 1-15
5. M. Bianchi, L. Branchini, N. Casari, A. De Pascale, et al. *Experimental analysis of a micro-ORC driven by piston expander for low-grade heat recovery.* Applied Thermal Engineering 148, 5 February 2019, 1278-1291
6. M. A. Ancona, M. Bianchi, L. Branchini, A. De Pascale, F. Melino, M. Mormile, M. Palella, L.B. Scarponi. *Investigation on small-scale low pressure LNG production process.* Applied Energy, 227 (2018) 672-685
7. M.A. Ancona, M. Bianchi, L. Branchini, A. De Pascale, et al. *From solar to hydrogen: Preliminary experimental investigation on a small scale facility.* International Journal of Hydrogen Energy 42 (33), 2017, Pages 20979-2099. doi: 10.1016/j.ijhydene.2017.06.141
8. V. Antonucci, L. Branchini, G. Brunaccini, A. De Pascale, et al. *Thermal integration of a SOFC power generator and a Na-NiCl2 battery for CHP domestic application.* Applied Energy, 185 (2017) 1256–1267. doi: 10.1016/j.apenergy.2016.04.051
9. V. Orlandini, L. Pierobon, S. Schløer, A. De Pascale, F. Haglind. *Dynamic performance of a novel offshore power system integrated with a wind farm.* Energy 109 (2016) 236-247.

INT. CONFERENCES (WITH PEER REVIEW PAPER) SPEECHES

- 2005 ASME TURBOEXPO 2005 – June 6–9, 2005, Reno-Tahoe, Nevada, USA - 1 paper presentation
- 2007 ASME TURBOEXPO 2007 – 14-17/5/2007 – Montreal, Canada - 1 paper presentation
- 2008 ASME TURBOEXPO 2008 – 9-13/6/2008 – Berlin, Germany - 2 paper presentations
- 2010 ASME TURBOEXPO 2010 – June 14 -18 Glasgow, Scotland - 1 paper presentation
- 2010 ASME-ATI-UIT 2010 - 16 – 19/5/2010, Sorrento, Italy - 1 paper presentation
- 2011 ASME TURBOEXPO 2011 – 6-10/6/2011 – Vancouver, Canada - 1 paper presentation
- 2011 ICAE 2011 - 16-18 May 2011 - Perugia, Italy - 2 paper presentations
- 2012 ASME TURBOEXPO 2012 – 11-15/6/2012 – Copenhagen, Denmark - 1 paper presentation
- 2012 ICAE 2012 - Jul 5-8, 2012, Suzhou, China - 2 paper presentations
- 2013 MicroGEN III - 15-17 April 2013 Naples, Italy – 1 paper presentation
- 2013 ICAE 2013 - 2-5/7/2013 – Pretoria, South Africa - 1 paper presentation
- 2014 ASME TURBOEXPO 2014 - 16-20/6/2014 – Dusseldorf, Germany - 2 paper presentations
- 2015 ICAE2015 - 23-31/3/2015 – Abu Dhabi - 2 paper presentations
- 2016 ASME TURBOEXPO 2016 – 13-17/6/2016 – Seoul, South Korea – 1 paper presentation
- 2016 ICAE 2016 – 18-11/10/2016 – Beijing, China - 1 paper presentation
- 2018 ASME TURBOEXPO 2018 - Oslo, Norway - 1 tutorial invited speech (no peer)
- 2018 ICAE 2018 - 21-25/8/2018 - Hong Kong - 1 paper presentation
- 2018 SDEWES 2018 - 30/9-4/10/2018 - Palermo - 1 invited speech

Bologna, 16/01/2023 Andrea De Pascale