

Curriculum Vitae

Maria Grazia De Giorgi

She was born in Lecce on November 29th 1974.

EDUCATION:

2003: she took the University Doctorate in Energy System and Environment, with a thesis on "Two-phase flows for industrial applications", at University of Salento. Italy.

2001: she took the Post Graduate Diploma Course in Industrial Fluid Dynamics, with honours, Environmental and Applied Fluid Dynamic, at Von Karman Institute, Bruxelles, Belgium, with a thesis on "Global rainbow thermometry applied to a flashing freon jet", tutor Prof. J. Van Beeck. She took a one year postgraduate diploma course fellowship at the V.K.I. for Fluid Dynamics (by NATO).

2000: University Degree in Material Engineering, thesis on "Fluid dynamic analysis of cavitation in machine", University of Salento, Italy.

ISTITUTIONAL EXPERIENCE

31 December 2001 at present: She is assistant professor in Aerospace Propulsion (S.S.D. ING/IND 07) at Faculty of Engineering of the University of Salento in Lecce.

Novembre 2004 –2008 UNIVERSITA' DEL SALENTO (ex UNIVERSITA' DEGLI STUDI di LECCE). Member of the "Giunta" of the Department of Engineering for Innovation, University of Salento

January 2004-2014 Scientific Manager of the Laboratory of Mechanical and Thermal Measurements of the Department of Engineering for Innovation, University of Salento

From 30/03/ 2012 up now member of the committee of framework partnership agreement between the University of Salento and the Ministry of the Interior-Fire Departments

From April 2012 up to now member of “Commissione del gruppo di lavoro accreditamento EUR-ACE , nominata dal Consiglio didattico di Ingegneria Industriale della Facoltà di Ingegneria dell’Università del Salento”

January 2014 up to now Scientific Manager of the Laboratory of “Green Engine- laser measurements” of the Department of Engineering for Innovation, University of Salento

FELLOWSHIP

September 2000-June 2001 NATO fellowship- Von Karman Institute for Fluid Dynamics, Rhode Saint Genese, Belgium

NATIONAL SCIENTIFIC HABILITATION

December 2014: National Scientific Habilitation (art.16 della legge n 240/2010) for Associate Professor in “Settore concorsuale 09/C1 - MACCHINE E SISTEMI PER L'ENERGIA E L'AMBIENTE”

PARTECIPATION TO EDITORIAL BOARD AND REVIEW ACTIVITIES

July 2010 Chair Session of the Technical Session “Gas and steam power plants”, ASME 10th Biennial Conference on Engineering Systems Design and Analysis (ESDA), Istanbul, 12-14 July 2010.

September 2015 Editor of the 38th Combustion Meeting Proceedings – Abstract Book ISBN 978-88-88104-25-6(editors: Andrea D'Anna, Anna Ciajolo, Mario Commodo, Maria Grazia De Giorgi, Ömer L. Gülder, Antonio Tregrossi) ASICI - Associazione Sezione Italiana del Combustion Institute P. Tecchio, 80, 80125 Napoli

September 2015 Member of Committee of the XXXVIII Meeting of the Italian Section of the Combustion Institute, Lecce, Italy, September 20-23, 2015

11 September 2015 Chairman Session 3.2-C – “Efficienza energetica negli usi industriali”, 70° Congresso Annuale ATI 2015, Roma.

She is reviewer of the following Journals: Applied Energy (ELSEVIER), Energy (ELSEVIER), Energy Conversion and Management (ELSEVIER), Energies, International Journal of Electrical Power and Energy Systems, Neurocomputing, Journal of Aerospace Engineering, Measurement (ELSEVIER), IET Generation, Transmission & Distribution, Journal of Mechanical Engineering Science, IEEE Transactions on Smart Grid, International Journal of Electrical Power and Energy Systems.

INVITED LECTURES

- 2 September 2015 Invited lecture “Experimental Diagnostics of Combustion Dynamics and Instability Near Lean Blowout in a Liquid-Fueled Combustor” at the Workshop ‘Advances in Gas Turbine Design’, Conference CMFF’15 in Budapest.
- 15 October 2015 Invited lecture “Experimental investigation of near lean blowout flame behaviour in a liquid fuelled combustor with single and multipoint injection” ERCOFTAC Autumn Festival Venue: Museo Leonardiano, Piazza dei Guidi, 50059, Vinci, Firenze, Italy, 15th – 16th October 2015.

INTERNATIONAL COLLABORATIONS

September 2000- June 2001: she was involved in research activities at Von Karman Institute, Bruxelles, Belgium regarding the application of the Global rainbow thermometry applied to a flashing freon jet.

August 2014 Visiting academic researcher 17-29 August 2014 at the Center for Research in Sustainable Aviation, University of Toronto Institute for Aerospace Studies, 4925 Dufferin St., Toronto, Ontario M3H 5T6, Canada

She still collaborates with the group of Prof. P. Lavoie of Center for Research in Sustainable Aviation, University of Toronto Institute for Aerospace Studies, 4925 Dufferin St., Toronto, Ontario M3H 5T6, Canada. The activities regard the development and testing of novel microplasma actuators for the flow control. The collaboration also involves the CNR IMM of Lecce.

She is tutor and collaborate with the VON Karman Institute for Fluid Dynamics (VKI) - Rhode-Saint-Genèse, Belgium, for the traineeship of student at the VKI. In 2011/2012 she was reference professor for the Faculty of Engineering for the LLP/ERASMUS CONSORZIO PLACEMENT A.A. 2011/2012, for the partnership with VON Karman Institute for Fluid Dynamics-Rhode-Saint-Genèse, Belgium.

September 2015 up to 2018 Technical Team Member of the NATO STO Science and Technology Organization Technical Team: AVT-254 on Assessment of Plasma Actuator Technologies for Internal Flows”

MEMBERSHIPS

Senior member of American Institute of Aeronautics and Astronautics (AIAA)

Member of American Society of Mechanical Engineers (ASME).

Member of the Combustion Institute.

She is a member of CREA (Energy Center for Energy and Environment). The Energy and Environment Research Center is a research group at the University of Lecce under the leadership of prof. ing. Domenico Laforgia. The activities are related to a wide range of fields such as combustion, industrial processes and many others. The action of the group include fundamental research and modeling of basic flow phenomena by combining experimental, theoretical and numerical approaches. The fields of combustion, fluid dynamic, aerospace propulsion, internal combustion engine performances, designing of injection systems, combustion analysis of alternative fuels, reduction of pollutant emissions, industrial processes.

EXTERNAL RESEARCH GRANTS AND CONTRACTS

She has been involved in several research projects, as follow.

APULIA SPACE - PON03PE-0M67-6 Asse I - Reti per il rafforzamento del potenziale scientifico-tecnologico delle Regioni della Convergenza. (Start: 01 July 2013).

Responsibilities: Project Leader. The general objective of this project is on one hand to support and

ensure the use of EO based services at the regional level; and on the other hand to increase competitiveness of the Apulia Region in European and Global projects such as those for new Earth Observation space segments and for the Exploration of the Universe.

The activities of the research group have been focused on the investigation of lean non premixed and premixed methane/air flame with the application of plasma actuator for the flame stabilization. A microburner with plasma actuator device has been designed and tested.

PROGETTO MEA Asse I - Reti per il rafforzamento del potenziale scientifico-tecnologico delle Regioni della Convergenza (period: 2013-2016). The project, aimed to investigate hybrid aircraft propulsive architectures able to optimize the on board energy management and to reduce environmental impacts, deals with system aspects (KPI definition, architecture definition) and with enabling technologies required to realize the selected architectures. Responsibilities: Researcher and tutor of assistant researcher

GREENING THE PROPULSION "Avviso per lo Sviluppo e potenziamento di Cluster Tecnologici Nazionali (DD 257/Ric del 30 maggio 2012)" (period 2013-2016). The "Greening the Propulsion", presented as part of the Cluster "Aerospace", aims to strengthen the industrial, scientific and district levels through the involvement of a national system of

distinctive competences already involved by Avio in collaboration projects and in other research projects for the development of new technologies for aeronautical and space applications, with the aim to maintain international competitiveness in the champions of the sector. The activities regard Hybrid Engine for Aeronautical applications, with a particular focus on the most innovative aircraft configurations "more electric" in order to seize opportunities for new products following the development trends of electricity needs. Responsibilities: Reasercher

CSEEM Center for Sustainable Energy, Environment and Mobility (Programma Operativo Nazionale – Ricerca e Competitività 2007-2013, Asse 1: "Sostegno ai mutamenti strutturali", Obiettivo Operativo 4.1.1.4: "POTENZIAMENTO DELLE STRUTTURE E DELLE DOTAZIONI SCIENTIFICHE E TECNOLOGICHE") (24 MONTHS).

The project aims to develop a research center of excellence on the energy, environment and mobility. The project is focused on two main areas: transport- mobility and energy with 9 laboratories. The candidate is responsible for the activities of the laboratory of the technologies for the eco-efficient Aeronautical mobility. The project funding have been used for the improvement of the equipment of the laboratory of GREEN-ENGINE Laser Diagnostic, of which the candidate is the scientific main leader.

Project GREEN ENGINE founded within the FP RICERCA SCIENTIFICA. This laboratory network integrates the following tasks: combustion propulsion and related chemical and physical issues; sensors development; developing materials at high temperatures. The aim of the proposal is to create a network between these skills in order to support the research activities and development. This laboratory network integrates the following tasks:

- Combustion propulsion and related chemical and physical issues
- sensors development
- Developing materials at high temperatures

These activities are organic placement in the proposed "Distretto Aerospaziale Pugliese" (Aerospace District), and in the Competence Center of Transportation.

The tools and technologies that the proposed network intend to develop are:

- Testing and monitoring instrumental combustion for propulsion applications, but can also test innovative engines for aeronautical propulsion;
- Study of the Construction aspects of the combustion chambers;
- Development sensors for monitoring combustion and concentration of pollutant emissions to be integrated avionics equipment in the engine control;
- Development of ceramic materials resistant to high temperatures, for motor applications (increased efficiency of the engine) and for more general applications at high temperatures (for example in Helicopter);
- Characterisation of the corrosion performance of metallic metarials in propulsion.

She was involved in the design of the gas turbine combustion chamber test rig as well as in the design of the experimental apparatus for combustion diagnostic.

BUILDINGS ENERGY ADVANCED MANAGEMENT SYSTEM – BEAMS (period: 2011-2014). BEAMS is an EU Research and Development project funded by the EC in the

context of the 7th Framework Program. Its strategic goal is the development of an advanced, integrated management system which enables energy efficiency in buildings and special infrastructures from a holistic perspective.

The main aim is the development of an integrated system (smart and autolearning) for the efficient energy management of buildings that are equipped with renewable energy sources. The main focus of the activities for the research group and the candidate has been the implementation of artificial neural networks and supervised learning methods for the prediction of photovoltaic power.

MALET – DEVELOPMENT OF TECHNOLOGIES FOR HIGH HEIGHT AND LONG FUEL DISTANCE PROPULSION OF UNMANNED AIRCRAFTS founded within Progetti PON “Ricerca e Competitività” 2007 – 2013. The aim of the project is to acquire technologies and their validation in order to develop a propulsion system for Unmanned Aerial Vehicle (UAV) that have a mission at a high altitude for a long duration. The purpose of the research is to find technological solutions that make an internal combustion engine deliver enough power even at a high altitude, respecting the aeronautical constraint of the low value of weight/power ratio. The propulsive system that was suggested, which the technological project derives from, will be based on a two stroke engine with direct injection electronically controlled (common rail). The choice of the Diesel common rail two stroke engine aims to give the best balance between the structural weight, the required efficiency, the necessity to keep low the thermo-mechanical loads in the combustion chamber and the deliverable power. This engine will be supercharged by a multistage system, which will be light and efficient. In this system an innovative electrical and fluid dynamic machine (MEF) will be integrated, which will recover the overproduced energy, that would be dissipated at low altitude through the wastegate valves, and eventually supply energy in order to compress the air and so aid the supercharging system. The supercharging system with MEF minimizes the use of wastegate valves allowing, when an overuse of overboost is present, the elaboration of supercharged flow and the conversion of mechanical energy in electrical energy available on board. The MEF machine works also as a separated blow for engine ignition, replacing with more lightness and efficiency the classic Roots compressor. All the technologies will be tested at a ground level with the realization of a technological demonstrator, that will be submitted to experimental investigation including simulations at the maximum flight altitude. The tests will provide the characterization of the principal engine parameters together with those characteristic of aeronautical applications. The tests will come to an end with the integration of the demonstrator on an UAV vehicle in order to test out the main features. She is involved in particular in the CFD fluid dynamic simulations of the two stroke engine.

TEPLAN PROJECT: Development of innovative technologies for plasma thermal-destruction of waste on board of a ship”, in collaboration with CETMA – Brindisi (Italy); PON2001-2006 (36 MESI). The activity regards the CFD numerical simulation of a plasma thermal-destruction of waste on board of a ship.

PROJECT OF A PUBLIC/PRIVATE LAB FOR THE DEVELOPMENT OF INNOVATIVE TECHNOLOGIES IN THE FIELD OF DIFFUSED POWER GENERATION BY SOLAR SOURCE (SOLAR) -PON 2007/2013 – (36 Months) founded by the University and Research Italian Ministry (MIUR). The project aims to develop a center-lab specialized in researching innovative technical solutions for the realization of high temperature solar power plants for direct (through thermodynamic cycles) and indirect (through thermochemical processes for hydrogen-rich fuels production) electricity production.

Project INTERREG IIIA – “ENERWOOD” – DEVELOPMENT OF A SMALL PILOT PLANT FOR THE COMBINED PRODUCTION OF ELECTRIC POWER AND HEAT FROM BIOMASS BASED ON THE STIRLING ENGINE – Goal of the project is to develop a prototype of a power plant for the cogeneration of heat and electric power fuelled with biomasses. The electrical energy is obtained by a Stirling engine. The remaining part of the energy, recovered at the thermal “cold source” of the engine, is available as heat.

SETE project: Development of a combined system for microgeneration with negligible environmental impact: solar, eolic and thermo-photo-voltaic”, in collaboration with the Environment Ministry;.(24 Months)

APPLICATION OF PROTOTYPING TECHNIQUES AND DESIGN FOR THE DEVELOPMENT OF INDUSTRIAL COMPONENT WITH INNOVATIVE MATERIALS – PROJECT P11 - CLUSTER 26 - 488/92 (36 MESI) – The project regards the analysis of the spray and of the injection systems for the optimization of internal combustion engine with innovative diagnostic techniques, injectors. Responsibilities: Researcher

PIA Regional project PIT 5 “INTEGRATED SYSTEM GASIFIER-ENGINE FOR THE ENERGETIC USAGE OF LIGNOCELLULOSIC BIOMASSES ON A SMALL SCALE IN COGENERATIVE CONFIGURATION”. The project aims at realizing a pilot power plant in order to use the gas deriving from the biomass gasification in an internal combustion engine for the electric power generation.

Activity commissioned by SOCOGES s.r.l. within the project “CONTROL AND MANAGEMENT OF COGENERATION PLANT FED WITH LIGNOCELLULOSIC BIOMASSES”, founded by Programma Operativo 2007-2013 della Regione Puglia (Asse I – Linea 1.1).

Project “NON INTRUSIVE DIAGNOSIS AND MONITORING OF MALFUNCTIONING OF MECHANICAL SYSTEMS AND COMBUSTION PROCESS IN INTERNAL COMBUSTION ENGINES”, commissioned by Union Key s.r.l.

RESEARCH AREA OF INTEREST

She was involved in several basic and applied research in national research projects and development projects in collaboration with the industries . The research activities regard

applied fluid dynamic for industrial design, especially in the field of flow control in turbomachinery, lean combustion in gas turbine burner, multiphase flows, experiments and simulations of cavitating flows, simulations of hydrofoils performances, simulation of combustion processes, combustion and NO_x reduction in coal burners, artificial neural networking for renewable power prediction.

At the Von Karman Institute for Fluid Dynamics she was involved in the development of an experimental laser technique (Global Rainbow Thermometry) for the non intrusive analysis of spray and jets.

In the field of the aerospace propulsion, the research activities were developed in the fields of the use of the cryogenic fuels, with particular regard to the cavitation effects, and in the field of mixing and combustion in LO_x/CH₄ spray under supercritical conditions.

In recent years she has addressed the issue of active flow control using plasma actuators and synthetic jets. She is author of 100 papers, published in international journals or presented at international and national congresses and symposia.

He is author of several papers, published in international journals or presented at international congresses and symposia. The scientific activities were developed in the fields of unsteady and two-phase fluid-dynamic inside machines and apparatus, thermo and fluid dynamic applied to industrial processes simulation, industrial energy applications and related environmental subjects.

In the field of turbomachinery she investigated the use of active flow control device for separation control.

These devices could potentially be applied in several applications, as the control of separated flow in compressor or low pressure turbine, and the by-pass transition control.

In this context the main issue is the optimization of the design and material of the active flow control device to improve its efficiency.

Several investigations regard the use of micro plasma actuators as active flow control device. Particularly, the experimental characterization and the computational modeling of a single dielectric barrier discharge (SDBD) plasma actuator were carried out; its applications as a flow actuator were studied. The plasma acts as a momentum source to the boundary layer allowing it to remain attached throughout a large portion of the airfoil.

The RANS simulations were performed using a CFD code in which the plasma force have been modeled as paraelectric force acting on the charged particles in the working flow

Finally, this numerical simulation methodology has been used for the investigations on the potential of plasma actuators, to suppress the flow separation over a compressor blade.

Specifically, the analysis has been focused to evaluate the increasing of the compressor performance depending on the actuator strength and position on the blade

Several studies were carried out using a CFD analysis applied to study the suppression of the boundary layer separation into a highly - loaded subsonic compressor stator cascade, by different active flow control techniques. In particular three different techniques have

been applied: the actuation by steady jet, by zero net mass flux Synthetic Jet (SJA) and plasma actuator.

Using the numerical model, the effect of plasma actuators to suppress the flow separation over the blade has been investigated, increasing the turbo-machinery performance too. The comparison between the different actuation devices shows that, reducing the secondary flow structures, each actuation technique beneficially affects the performance of the stator compressor cascade, even if in the steady jet the costs are relevant.

At the " GE-Lab Laser Diagnostic", of which she is responsible scientific, the experimental characterization of the plasma actuators in presence of quiescent flows on a plate has been performed, in order to estimate the thrust given by the device and the flow induced velocity field. The device has been designed and fabricated in collaboration with the CNR-IMM of Lecce. A dedicated activity was devoted to microelectronic technology adoption for copper (Cu) electrode fabrication on glass-reinforced epoxy laminate (FR4) substrates, together with batch production of electrodes with photolithographic techniques.

The experimental investigations were performed at different actuation conditions in terms of amplitude voltage and actuation frequency.

The devices have been characterized through thermal (infrared camera) analysis, plasma discharge visualizations (intensified camera) and determination of the velocity field by Particle Image Velocimetry "PIV" and Laser Doppler Anemometer. The induced flow was investigated by particle image velocimetry and the measured velocity fields were used to estimate experimentally the time-averaged induced body force distributions by a differential method. Plasma induced forces were modeled by following three different approaches, later implemented as a source term in the Navier-Stokes equations for the fluid flow simulations. Potentialities, advantages and disadvantages of the considered Numerical simulations were also performed to investigate the effects of these devices in turbomachinery, as compressor and low pressure turbine, and to compare their performance with the ones of fluidic jets (steady and synthetic jet).

An experimental setup has been realized for the study of the active flow control using plasma actuators to reattach the simulated separation flow over the suction surface of a low-pressure turbine blade at low Reynolds number. Different actuator geometries have been also numerically studied: a macro single dielectric barrier discharge (SDBD), a micro SDBD and a micro linear plasma synthetic jet (L-PSJ) with and without thrust vectoring. In particular, the micro plasma actuator was realized and experimentally characterized by measuring the induced wall-jet with Particle Image Velocimetry (PIV) and by evaluating the electrical power consumption. The numerical modelling was used to assess and compare the performances of the different configurations in the separation control. In presence of these active flow control devices the separated flow was successfully reduced. The activities on active flow control are in collaboration with the the group of I prof. P. Lavoie of Center for Research in Sustainable Aviation, University of Toronto Institute for Aerospace Studies, 4925 Dufferin St., Toronto, Ontario M3H 5T6, Canada.

The activities on plasma actuators also involve the potentiality of lean flame stabilization in the context of the project APULIASPACE (PON03PE-0M67-6 Asse I - Reti per il rafforzamento del potenziale scientifico-tecnologico delle Regioni della Convergenza), of which she is scientific leader. Aim of the investigation is the characterization of a non-premixed methane/air microburner, Bunsen-type, equipped with a plasma actuator for the flame stabilization and the blowoff control. The burner is optically accessible to permit imaging acquisitions of the flame region. The plasma actuation regards alternatively the air flow and the fuel flow, while the other flow is protected by the action of the electric field. The electric field was generated using a fixed configuration of plasma actuator, the Dielectric Barrier Discharge (DBD) but using two different power supplies: a nanosecond repetitively pulsed high voltage (NRPP) and a sinusoidal DBD high voltage (HV). The comparison between the two types of actuation is the core of the present work, together with the analysis of the results obtained when actuation acted on the air or on the fuel. For the analysis, the limits of blowoff were recorded in presence and in absence of plasma actuation to individuate the improvement margins of the plasma actuation. The flame behavior was acquired using a compact digital camera, an Intensified Charge-Coupled Device, and a photomultiplier tube equipped with an OH* filter, in order to capture the differences between the baseline conditions and the actuated cases. It was shown that the plasma significantly allows stabilizing the flame under lean conditions where it would not exist without plasma. The results appear very encouraging for future application in powering micro-devices for aerial and industrial applications. The activity is in collaboration with CNR-NANOTEC (Laboratorio P.La.S.Mi. Lab. BARI).

For both the activities she is involved also in the Technical Team Member of the NATO STO Science and Technology Organization Technical Team: AVT-254 on Assessment of Plasma Actuator Technologies for Internal Flows”, nominata per la durata del Team. In the following the description of the AVT-254 as reported in . “This Task Group builds up on the work of AVT-190 on “Plasma Based Flow Control for Performance and Control of Military Vehicles”. Plasma based Flow Control (PFC) is a disruptive technology to improve NATO air and sea vehicle performance, stability and control. Variety of plasma generation methods have been investigated during AVT-190 that include Dielectric Barrier Discharge (DBD), Direct Current (DC) and High Frequency (HF) discharge, and laser and microwave discharges. PFC is applicable to subsonic, supersonic and hypersonic vehicles. Specifically in AVT-190, detailed validation and standardization of computational methods with a common experimental database was performed for the potential fluids, speed, and altitude applications of PFC. As a follow on, we will focus on standardization of internal flows using sustainable plasma actuator technologies. These results will allow ability to accurately predict plasma actuated force and moment changes on air and sea

vehicles using combined Computational Fluid Dynamics (CFD), Computational Magneto Gas- and Hydrodynamics (CMGD and CMHD) that could help revolutionize vehicle configuration design, performance, stability and control for NATO sea and air vehicles. STO is uniquely qualified to organize a multi-national NATO effort to standardize plasma actuated internal flows for evaluating broad class of PFC. An STO Task Group will establish a coherent multi-national effort to establish a common experimental database, define specific evaluation criteria, assess current predictive capabilities and encourage further development of new control methods for PFC internal flows.”

Furthermore a numerical evaluation of the effects of volcanic ash ingestion in a turbofan engine was carried out, with particular regard to the prediction of the erosion damage to fan blades. The ash concentration level examined in the study was below the flight limit because the aim of this study is to investigate the damage due to long-term exposure to low concentration levels. The work aims to the implementation of a numerical methodology that takes into account the geometry change of the fan blades during the exposure to volcanic ash. A dimensional and morphological characterization of a real volcanic ash sample from the Mount Etna volcano has been performed to model the particle flow dynamics using a computational fluid dynamics (CFD) code. The fan performance in terms of the total pressure increase was calculated for both the baseline and damaged geometries to quantify the performance deterioration trend with respect to the particle exposure time. For the calculation of the eroded fan performance, two different numerical approaches were considered. In the first approach, the erosion rate (ER) was evaluated based on the initial blade geometry and was held constant. In the second approach, the ER was updated as the erosion of the blade continued. The second approach shows a higher deterioration of the pressure rise across the fan, suggesting that the variation of the ER due to the blade shape modification cannot be neglected in the calculations.

In the field of the aerospace propulsion the research activities were developed in the fields of the active control of flows (for external profiles or inside the turbo-machinery) and of cryogenic fuels, with particular regard to the cavitation effects and the spray and combustion behavior.

In the field of the renewable energy, the research activity was devoted to the forecasting of the power produced by a wind farm. Different forecasting models - Auto Regressive Moving Average (ARMA) models, which perform a linear mapping between inputs and outputs, Artificial Neural Networks (ANNs) and Adaptive Neuro-Fuzzy Inference Systems (ANFIS) – have been analyzed, to perform a non-linear mapping and to provide a robust approach to wind power prediction. Some new hybrid methods were analyzed and proposed, based on the application of the six Daubechies wavelet employed to do the 3rd level discrete wavelet decomposition of the original hourly wind power time series, in combination with ANNs, ARMA and ANFIS models, in order to predict the power

production of a wind farm. In particular, the results obtained with and without the wavelet decomposition were compared for each of the aforementioned techniques (ANNs, ARMA and ANFIS), by investigating the error of the different prediction systems for various forecasting horizons; the statistical distributions of the error are calculated and presented.

In the aerospace field, the research activities regarded the combustion phenomena in liquid-propellant rocket engines. The combustion occurs at operating conditions well above of the thermodynamic critical points of the fluid where reactants properties show liquid-like densities, gas-like diffusivity, and pressure-dependent solubility. Actually, there is a great interest in the development of reusable liquid rocket engines that operates with methane and liquid oxygen as propellants. In the carried-out numerical study of LOX/CH₄ jet flames, the choice of the combustion model is a critical point: it should be accurate in the phenomena description but it should also be characterized by a low computational cost. Different combustion models were used as the Eddy-dissipation finite-rate approach based on Arrhenius chemical kinetics, the equilibrium mixture fraction model (PDF) and the Steady State Flamelet approaches. Different chemical kinetics schemes were used, as the Skeletal mechanism and the Jones- Lindstedt mechanism, that permit to limit the number of reactions and species but taking into account also the intermediate species in the flame. Finally, an Eulerian (i.e., single phase) methodology by using both ideal gas and real gas equation of state was used as well as a discrete phase approach that uses an Eulerian description of the gas phase and Lagrangian equations for the dilute spray.

DISSERTATIONS/STUDENTS SUPERVISED

Doctoral Theses finished

- Bello Daniela , “Computational modeling of thermo and fluid-dynamic effects in cavitating nozzles and experimental characterization” , XXII CICLO - 2010/2011;
- Rodio Maria Giovanna , “Numerical and experimental investigation of water and cryogenic cavitating flows”, XXIII CICLO - 2010/2011;
- Traficante Stefania , “Numerical modeling of active flow control using plasma actuators and study of turbomachinery application”, XXIV CICLO - 2011/2012.
- Carla De Luca, “Active Flow Control of Separated Flows in Turbomachinery by Continuous and Synthetic Jets”, XXV CICLO - 2012/2013.
- Campilongo Stefano,, “Experimental And Numerical Study Of Particle Ingestion In Aircraft Engine” , XXV CICLO - 2012/2013
- Pescini Elisa, “Experimental and Numerical Characterization of Dielectric Barrier Discharge Plasma Actuators for Active Flow Control of Boundary Layer Separation and Bypass Transition” XXVII CICLO- 2014/2015

Master Thesis

She was the tutor of several master thesis as follows:

- Master thesis Energy Management (Gestione Industriale dell'Energia), "Audit Energetico Di Una Struttura Alberghiera Nell'ottica Della Razionalizzazione Energetica", laureanda Anna Della Vergine, a.a. 2003-2004;
- Master thesis Energy Management (Gestione Industriale dell'Energia), "Energy Audit Del Comune Di Specchia Nell'ottica Della Razionalizzazione Energetica", student Francesco Boellis, a.a.2004-05;
- Master thesis Energy Management (Gestione Industriale dell'energia), "Analisi E Razionalizzazione Dei Consumi Energetici Del Comune Di Miggiano", student Alberto Mengoli; a.a. 2005-06;
- Master thesis Industrial Process Energy (Impiego industriale dell'energia) "Applicazione Di Tecniche Di Calcolo Cfd Per Lo Studio Della Fluidodinamica Nei Microcanali", student Tonio Spedicato, a.a 2006-07;
- Master thesis Industrial Process Energy (Impiego industriale dell'energia), "Studio fluidodinamico di flussi cavitanti criogenici per la propulsione aerospaziale", student Fabrizio Antermite, a.a. 2006-2007;
- Master thesis Pianificazione e gestione delle infrastrutture energetiche, "Simulazione della fluidodinamica di una pem fuel cell", student Davide Fanelli, a.a. 2006-2007;
- Master thesis Industrial Process Energy (Impiego industriale dell'energia), "Analisi termo fluidodinamica di microscambiatori di calore", laureanda Emilia Mariano, a.a. 2006-2007;
- Master thesis in Planning and management of the energy infrastructures, "Studio teorico-sperimentale di flussi bifase nei sistemi energetici", laureanda Maria Giovanna Rodio, a.a. 2006-07;
- Master thesis Industrial Process Energy (Impiego industriale dell'energia), "analisi termofluidodinamica della gassificazione di biomasse", student Alberto Scarpello, a.a. 2006-07
- Master thesis Industrial Process Energy (Impiego industriale dell'energia), "Studio di un apparato sperimentale per l'analisi di spray ad alta temperatura e pressione", student Marcello Giangreco, a.a. 2007-08.
- Master thesis Aerospace Propulsion II, "Studio del sistema di iniezione spray LOx-CH4 per lanciatori spaziali in condizioni supercritiche", student Alessio Leuzzi, a.a. 2007-08.
- Master thesis Industrial Process Energy (Impiego industriale dell'energia) "Studio Termofluidodinamico Della Gassificazione Di Biomasse Attraverso Tecniche Cfd", laureanda Paola Calò, a.a. 2007-08.
- Master thesis in Planning and management of the energy infrastructures, "Sviluppo Di Un Metodo Basato Su Reti Neurali Artificiali Per La Previsione A Breve-Medio Periodo Della Potenza Elettrica Prodotta Da Impianti Eolici", laureanda Mariangela Arcardini, a.a. 2008-09.

- Master thesis **Impianti Termotecnici** "Studio Termo-Fluidodinamico Di Flussi Bifase In Microcanali", student Giuseppe Cacciatore, a.a. 2009-10.
- Master thesis Industrial Process Energy (Impiego industriale dell'energia) "Controllo attivo del flusso attraverso attuatori al plasma", student Giuseppe Cassinelli, a.a. 2009-10.
- Master thesis Fluid Machinery "Rumorosità Delle Pale Eoliche", student Antonio Conte, a.a. 2009-10.
- Master thesis Fluid Machinery I "Utilizzo Dei Biocombustibili In Aeronautica E Studio Dello Spray", laureanda Palazzo Alessandra, a.a. 2009-10.
- Master thesis in Energy System and Environment "Analisi Delle Prestazioni Di Turbine A Gas Per Applicazioni Aeronautiche In Presenza Di Anomalie Di Funzionamento", student Francesca De Blasi, a.a. 2009-10.
- Master thesis Sistemi Energetici e dell'Ambiente" Studio Numerico Di Profili Alari Di Pale Di Turbine Eoliche", student Donato Fontanarosa, a.a. 2009-10.
- Master thesis Sistemi Energetici e dell'Ambiente "Applicazioni Di Algoritmi Neurali Per L'interpretazione Di Dati Sperimentali Di Flussi Bifase", student: Stefania Passabì, a.a. 2009-10.
- Master thesis in Planning and management of the energy infrastructures,"Simulazioni Fluidodinamiche Sulle Anomalie Di Funzionamento Di Un Motore Aeronautico", student Emanuele D'Urso, a.a. 2009-10.
- Master thesis in Fluid Machinery II "Supersonic condensing flow characterization by non intrusive measurement techniques", student Elisa Pescini, a.a. 2009-10. Tesi svolta in collaborazione con i relatori Dott.ssa Maria Rosaria Vetrano, Prof. Jeroen van Beeck, Prof. Patrick Rambaud del Von Karman Institute in Belgio.
- Master thesis in Fluid Machinery "Ottimizzazione di un profilo alare adattivo", student Danilo Borromeo, a.a. 2010-11.
- Master thesis in Planning and management of the energy infrastructures,"Valutazione Del Contributo Delle Nuove Configurazioni Dei Motori Aeronautici Alla Riduzione Delle Emissioni", laureanda Valentina Ruggero, a.a. 2010-11.
- Master thesis Fluid Machinery "Dispositivi Mems Applicati Alle Pale Eoliche Per Il Controllo Attivo Del Flusso", student Alessia Tarlo, a.a. 2010-11.
- Master thesis Fluid Machinery "Analisi di tecniche sperimentali per il controllo attivo del flusso attraverso attuatori al plasma." Student Galasso Vincenzo, a.a. 2012-13
- Master thesis Fluid Machinery II ed Energetica "Caratterizzazione E Monitoraggio Della Stabilità Di Fiamma Attraverso Tecniche Di Imaging" student Baglivi Francesco, a.a. 2012-13
- Master thesis in Fluid Machinery "Analisi Fluidodinamica Del Campo Di Moto All'aspirazione Di Un Motore Aeronautico Attraverso Tecniche Di Velocimetria Laser", student Davide Mazzotta, a.a. 2013-14.
- Master thesis in AIRCRAFT ENGINE DESIGN "Experimental Investigation Of Flame Stability In A Liquid Fuel Burner Near Lean Blowout Under Non Premixed And Partially Premixed Combustion Mode" student Alessia Romano, a.a. 2014-15.
- Master thesis in Fluid Machinery "Analisi Delle Prestazioni Di Un Motore Turboprop Per Velivoli Di Piccola Taglia", student Ferrara Giammario, a.a. 2014-15.

TEACHING ACTIVITIES

Member of the Ph. D Doctoral Board in "Energy System and Environment" of the University of Salento from 2004 until now.

Member of the Ph. D Doctoral Board in "Engineering of complex systems" of the University of Salento from 2013 to now.

She is member of the Committees for the following courses: **Aerospace Propulsion, Space Propulsion, Fluid Machines, Systems for Energy and Environment, Energy Infrastructures Planning and Management, Industrial Energetic, Energy Systems and Technologies, Fluid Dynamic, Renewable Energy and Environment; Fluid Machine Design; Mechanical Measurements; Thermal and Mechanical Measurements; Systems and technologies for energy.**

Courses Taught:

A.Y. 2015-2016: She is teacher for the course : "Aeronautical Propulsion " and course of "Space Propulsion" at the Faculty of Engineering of the University of Salento ; she is teacher for theoretical and experimental practice for the course of Fluid Machinery of prof. Antonio Ficarella at the Faculty of Engineering, University of Salento.

A.Y. 2014-2015: She is teacher for the course : "Aeronautical Propulsion " and course of "Space Propulsion" at the Faculty of Engineering of the University of Salento ; she is teacher for theoretical and experimental practice for the course of Fluid Machinery of prof. Antonio Ficarella at the Faculty of Engineering, University of Salento.

A.Y. 2013-2014: She is teacher for the course : "Aeronautical Propulsion " and course of "Space Propulsion" at the Faculty of Engineering of the University of Salento ; she is teacher for theoretical and experimental practice for the course of Fluid Machinery of prof. Antonio Ficarella at the Faculty of Engineering, University of Salento.

A.Y. 2012-2013: She is teacher for the course : "Aeronautical Propulsion " and course of "Space Propulsion" at the Faculty of Engineering (Brindisi) of the University of Salento ; she is teacher for theoretical and experimental practice for the course of Fluid Machinery of prof. Antonio Ficarella at the Faculty of Engineering, University of Salento.

A.Y. 2011-2012: She is teacher for the course : "Aeronautical Propulsion " and course of "Space Propulsion" at the Faculty of Industrial Engineering of the University of Salento; she is teacher for theoretical and experimental practice for the course of Fluid Machinery of prof. Antonio Ficarella at the Faculty of Engineering, University of Salento.

A.Y. 2010-2011: She is teacher for the course : "Aerospace Propulsion " at the Faculty of Industrial Engineering of the University of Salento; she is teacher for theoretical and experimental practice for the course of Fluid Machinery of prof. Antonio Ficarella at the Faculty of Industrial Engineering, University of Salento.

A.Y. 2009-2010: She is teacher for the course : "Aerospace Propulsion I " at the Faculty of Industrial Engineering of the University of Salento; A.Y. 2008-2009: Course of "Aerospace Propulsion I " and Course of "Aerospace Propulsion II at the Faculty of Industrial Engineering of the University of Salento; A.Y. 2007-2008: Course of "Aerospace Propulsion II " at the Faculty of Industrial Engineering of the Un. Of Salento;

A.Y. 2006-2007: She is teacher for the course : "Aerospace Propulsion I " at the Faculty of Industrial Engineering of the University of Salento; Course of "Industrial Process Energy" at the Faculty of Engineering of the Un. Of Salento;

A.Y. 2005-2006: She is teacher for the course : "Energy Management " at the Faculty of Engineering of the University of Salento; Course of "Industrial Process Energy" at the Faculty of Engineering of the University of Lecce;

A.Y. 2004-2005: She is teacher for the course : "Energy Management " at the Faculty of Engineering of the University of Salento; Course of "Industrial Process Energy" at the Faculty of Engineering of the University of Lecce;

A.Y.2003-2004: She is teacher for the course of: "Energy Management " at the Faculty of Engineering of the University of Lecce; Course of "Industrial Process Energy" at the Faculty of Engineering of the University of Lecce. She is teacher for theoretical and experimental practice for the course of Energy System and Environment of prof. Antonio Ficarella at the Faculty of Engineering, University of Lecce.

A.Y. 2002-2003: She is teacher for the course of "Energy Management " and Course of "Industrial Process Energy" at the Faculty of Engineering of the University of Lecce. She is teacher for theoretical and experimental practice for the course of Energy System and Environment of prof. Antonio Ficarella at the Faculty of Engineering, University of Lecce.

A.Y. 2001-2002: She is teacher for theoretical and experimental practice for the course of Energy System and Environment of prof. Antonio Ficarella at the Faculty of Engineering, University of Lecce.

She was teacher also at the following courses:

- February 2013-March 2013: "Aerospace propulsion" (25 hours), for the project "LABORATORIO sul REPAIR (LABREP)", PON01_0895. Decreto Ministeriale prot. n. 01/Ric del 18/01/2010 - PON Ricerca e Competitività 2007-2013 - Asse I area scientifico tecnologica.
- December 2012 "MA 2.2 Istituzioni di Aeronautica UD2 Motori " (10 hours), for the project "formazione per tecnici e specialisti per la progettazione di superfici alari in materiali compositi", Project "ASIA-ARCHITETTURE STRUTTURALI E PROCESSI INNOVATIVI DELL'ALA." Codice progetto: PON01_00292.
- July 2012-September 2012: "Aerodynamic and mechanics of propulsion in aircraft" (50 hours), project "ESPERTI IN PROGETTAZIONE DI MOTORI PER VELIVOLI SENZA PILOTA A BORDO (UAV)", a MALET "Sviluppo di tecnologie per la propulsione ad alta quota e lunga autonomia di velivoli non abitati". PON01_01693.

- February 2010: "Aeronautical Basics" (25 hours), MASTER INTERATENEO UNIVERSITA' DI NAPOLI "FEDERICO II" – UNIVERSITA' DEL SALENTO DI II LIVELLO IN TECNOLOGIE AERONAUTICHE: "AEROTECH".
- November 2007 – february 2008: Teacher at the course "Piano di Formazione per le imprese del Consorzio CONSAL" POR Puglia 2000-2006 – Misura 3.9, azione a) – Avviso n.19/2006, conferito dal Consorzio CONSAL, Via Conciliazione, 18, MAGLIE (Le).
- November 2007 – february 2008: Teacher at the course IFTS - Tecnico Superiore per il Monitoraggio e la Gestione dell'Ambiente (Modulo di strumenti e tecniche di monitoraggio), organized by "Agenzia dell'Energia" of Lecce.
- March-july 2007: Teacher of "Il quadro normativo di riferimento: fonti e strumenti" for MASTER UNIVERSITARIO DI I LIVELLO IN SISTEMI INTEGRATI, QUALITÀ, AMBIENTE E SICUREZZA. (48 hours)
- september 2006- february 2007: teacher in three courses in the field of environment – "Convenzione tra Provincia di Lecce e l'Università degli Studi di Lecce - Dipartimento di Ingegneria dell'Innovazione", course on "valutazione di impatto ambientale, valutazione ambientale strategica e valutazione di incidenza.
- June- september 2006: "Formazione del personale" Convenzione tra Regione Puglia - Assessorato all'Ambiente, ARPA Puglia, Università degli Studi di Bari - Centro METEA, Università degli Studi di Lecce - Dipartimento di Ingegneria dell'Innovazione, CNR-ISAC a valere sulle linee 6a e 7a del Programma Triennale per la Tutela dell'Ambiente della Regione Puglia - Linea d'azione F.
- April 2004:teacher at "Master dell'Automobile", Università di Lecce, course of "CFD simulations of automative component".

PUBLICATIONS

PUBBLICAZIONI SCIENTIFICHE

- 1) Maria Grazia De Giorgi, Antonio Ficarella, Domenico Laforgia, Callisto Genco, "Cavitation Modelling to Understand the Behaviour of Control Systems", **5th Biennial Conference On Engineering Systems Design & Analysis ESDA 2000**, Montreux, Switzerland, 10-13 luglio 2000.
- 2) Maria Grazia De Giorgi, Antonio Ficarella, Vincenzo Landriscina, Pierre Barthelet, Callisto Genco, "Modeling of Cavitation and of the Related Behaviour of the Control Valve in a Fuel Injection System", **55° Congresso Nazionale ATI**, Matera (Italia), 15-20 settembre 2000.

- 3) Maria Grazia De Giorgi, "Hot wire measurements in a turbulent jet", **Università degli Studi di Lecce, Internal Report**, Novembre 2000.
- 4) Maria Grazia De Giorgi , Antonio Ficarella, H. Breitbach, "Cavitation Effects and Transient Behavior for the Control Valve of a High-Pressure Diesel Injection System", **SAE Paper 2001-01-1979**, International Spring Fuels & Lubricants, Orlando, Florida (USA), 7-9 maggio 2001. Pubblicato su **2001 SAE Transactions - Journal of Fuels and Lubricants**, vol. 110, pp. 1310-1319, 2001.
- 5) Maria Grazia De Giorgi, "Global Rainbow Thermometry applied to a flashing freon jet", **Von Karman Institute Internal Report**, Bruxelles (Belgio), Giugno 2001.
- 6) Maria Grazia De Giorgi, Jeronimus P.A.J. van Beeck, Laurent Zimmer, Michel .L. Riethmuller, "Global Rainbow Thermometry With Spatial Filtering For Average Spray-Droplet Size And Temperature Measurement, **ILASS EUROPE 2001**, Zurich 2-6 september 2001.
- 7) Maria Grazia De Giorgi, Antonio Ficarella, Domenico. Laforgia, "Studio del transitorio nella valvola di controllo di un sistema di iniezione Diesel in presenza di cavitazione: indagine sperimentale e teorica", **57° Congresso ATI**, Pisa, 17-20 settembre 2002.
- 8) Maria Grazia De Giorgi, Arturo de Risi, Domenico. Laforgia, "Studio numerico e sperimentale di flussi cavitanti in iniettori VCO", **57° Congresso ATI**, Pisa, 17-20 settembre 2002.
- 9) Jeronimus Petrus Antonius Johannes van Beeck, Thomas Grosjes, Maria Grazia De Giorgi "Global Rainbow Thermometry: assessed by Airy and Lorenz-Mie theories and compared with phase Doppler anemometry", **Applied Optics**, 2003, Vol.42, No. 19, pp 4016-4022, doi: [10.1364/AO.42.004016](https://doi.org/10.1364/AO.42.004016)
- 10) Maria Grazia De Giorgi, Antonio Ficarella, Domenico. Laforgia "Cavitating Flow Simulations in Turbopumps", Atti del **58° Congresso Nazionale ATI**, Padova-San martino di Castrozza, 9-12 settembre 2003.
- 11) Maria Grazia De Giorgi, "Study of two phase flows for environmental and Energy applications", per il conferimento del **Dottorato di Ricerca in Sistemi Energetici ed Ambiente**, Università di Lecce, ottobre 2003.

- 12) Maria Grazia De Giorgi, Antonio Ficarella, Domenico Laforgia, "Comparison of different physical models for the simulation of cavitating flows around a hydrofoil", Paper No. FEDSM2005-77142, **ASME 2005 Fluids Engineering Division Summer Meeting** June 19-23, 2005, Houston, TX, USA, Volume 1: Symposia, Parts A and B, pp. 797-805, ISBN: 0-7918-4198-7;
- 13) Maria Grazia De Giorgi , Antonio Ficarella, Fabio Chiara, Domenico Laforgia, "Experimental and Numerical Investigations of Cavitating Flows", **35th AIAA Fluid Dynamics Conference and Exhibit**, 6 - 9 Jun 2005, Westin Harbour Castle, Toronto, Ontario, Canada, 2005. AIAA Meeting Papers on Disc, Vol. 10, No. 13-15. ISBN: 978-1-56347-764-5
- 14) Maria Grazia De Giorgi, Antonio Ficarella, Domenico Laforgia "Application of Multiphase CFD Modeling to Naval Design in Presence of Cavitation", **TCN CAE 2005** International Conference on CAE and Computational Technologies for Industry, October 5-8, 2005 Lecce, Italy
- 15) Maria Grazia De Giorgi, "Investigation Of Thermodynamic Effects In Cryogenic Cavitation" **ASME ATI Conference**, 14-17 May, 2006 Milan, Italy, Energy: Production, Distribution and Conservation ASME ATI Conference, Vol. II, pp.1067-1078, Milan, 14-17 Maggio 2006, Biblioteca termotecnica, n.34, ISBN: 88-89884-03-7.
- 16) Maria Grazia De Giorgi , Antonio Ficarella, Fabio Chiara "Experimental Study Of Thermal Cavitation In An Orifice", Asme Paper ESDA2006-95406, Proceedings of **ESDA2006 8th Biennial ASME Conference on Engineering Systems Design and Analysis**, July 4-7, 2006, Torino, Italy. Volume 1: Advanced Energy Systems, Advanced Materials, Aerospace, Automation and Robotics, Noise Control and Acoustics, and Systems Engineering, pp. 515-522, ISBN: 0-7918-4248-7
- 17) Maria Grazia De Giorgi, Antonio Ficarella, Domenico Laforgia "Optimization Of An Industrial Coal Pulvirezed Swirled Burner By Cfd Modelling", Atti del **61° Congresso Nazionale ATI**, Perugia, 12-15 Settembre 2006, Morlacchi Editore (ITA), 61, 2006, ISBN: 8860740487.
- 18) Maria Grazia De Giorgi, Antonio Ficarella, Domenico Laforgia "Study Of Thermal Cavitation In Water And In Cryogenic Flows", **Fluent Forum 2006** , Milano, 21 Novembre 2006.
- 19) Maria Grazia De Giorgi, Antonio Ficarella, Domenico Laforgia, Maria Giovanna Rodio, "Optimization Of A Coal Pulvirezed Swirled Burner By Cfd Modelling", **Fluent Forum 2006**, Milano, 21 Novembre 2006.

- 20) Maria Grazia De Giorgi, Antonio Ficarella, Domenico Laforgia "Modeling nucleation phenomena in cavitating flow", AIAA 2007-4459 , **18th AIAA Computational Fluid Dynamics Conference**, 25 - 28 June 2007, Miami, FL, ISBN: 978-1-56347-899-4
- 21) Maria Grazia De Giorgi, Antonio Ficarella, Domenico Laforgia "Nucleation effects on modeling of cavitating flows", **Ansys Fluent Users' Meeting 2007**, Stezzano (BG), 25-26 Ottobre 2007.
- 22) "Maria Grazia De Giorgi, Paolo Maria Congedo, Domenico Laforgia, "Caratterizzazione Fluidodinamica Di Un Parco Eolico", Atti del **62° Congresso Nazionale ATI** 11/14 Settembre 2007, Cuzzolin Editore (ITA), 62° Congresso Nazionale ATI, Fisciano 11-14 Settembre 2007, ISBN: 9788887998771.
- 23) Maria Grazia De Giorgi, Paolo Maria Congedo, Domenico Laforgia "Optimizing the layout of a wind farm", **Ansys Fluent Users' Meeting 2007**, Stezzano (BG), 25-26 Ottobre 2007.
- 24) Maria Grazia De Giorgi, Antonio Ficarella, D. Fanelli, "Performance Optimization Of A Pem Fuel Cell By A CFD Analysis", ASME Paper EFC2007-39158, Proceedings of **EFC2007 Second European Fuel Cell Technology and Applications Conference**, December 11-14, 2007, Rome, Italy.
- 25) Maria Grazia De Giorgi, Antonio Ficarella "CFD Modeling Of Pem Fuel Cell's Flow Channels", **ASME 2008 2nd International Conference on Energy Sustainability collocated with the Heat Transfer, Fluids Engineering, and 3rd Energy Nanotechnology Conferences (ES2008)** August 10–14, 2008 , Jacksonville, Florida, USA, Paper Number: ES2008-54197, ASME 2008 2nd International Conference on Energy Sustainability, Volume 1, pp. 537-547, ISBN: 978-0-7918-4319-2
- 26) Maria Grazia De Giorgi, Antonio Ficarella, Maria Giovanna Rodio, "Cavitation Modeling in Cryogenic Fluids for Liquid Rocket Engine Applications", AIAA-2008-3842, **AIAA 38th Fluid Dynamics Conference and Exhibit**, 23-26 giugno 2008, Seattle, USA, ISBN: 9781605603735
- 27) Maria Grazia De Giorgi, Maria Giovanna Rodio, Paolo Maria Congedo, Antonio Ficarella "Shape Optimization For Cryogenic Cavitating Flows Past An Isolated Hydrofoil", **ASME 2008 Fluids Engineering Division Summer Meeting collocated with the Heat Transfer, Energy Sustainability, and 3rd Energy Nanotechnology Conferences (FEDSM2008)**, August 10–14, 2008, Jacksonville, Florida, USA, Paper number: FEDSM2008-55119, Volume 1: Symposia, Parts A and B, pp. 75-85, ISBN: 978-0-7918-4840-1.
- 28) Maria Grazia De Giorgi, D. Fraccalvieri, Antonio Ficarella, Domenico Laforgia, "Studio Sperimentale Dell'influenza Della Qualità Dell'acqua Sull'innescio Del Fenomeno Della Cavitazione Nei Circuiti Idraulici", **63° Congresso Nazionale ATI**, Dario Flaccovio Editore (ITA), Palermo 23-26 settembre 2008, ISBN: 9788877588395
- 29) Maria Grazia De Giorgi, Antonio Ficarella, Maria Giovanna Rodio "Modellazione ed analisi sperimentale di flussi bifase criogenici", **63° Congresso Nazionale ATI**, Dario Flaccovio Editore (ITA), Palermo 23-26 settembre 2008, ISBN: 9788877588395

- 30) Maria Grazia De Giorgi, Maria Giovanna Rodio, Antonio Ficarella, Domenico Laforgia, "Flow Visualization Study On Two-Phase Cryogenic Flow", **22nd European Conference on Liquid Atomization and Spray Systems**, 8-10 September 2008, Como Lake, Italy, ISBN 978-88-903712-0-2, (2008), Politecnico di Milano.
- 31) Maria Grazia De Giorgi, Paolo Maria Congedo, "Optimizing of a wind turbine rotor by CFD modeling", **ANSYS Italy Conference 2008**, 16-17 Ottobre 2008, Mestre (VE).
- 32) Maria Grazia De Giorgi, Antonio Ficarella, Maria Giovanna Rodio "CFD Modeling Of Two Phase Cryogenic Flow In An Internal Orifice", **ANSYS Italy Conference 2008**, 16-17 Ottobre 2008, Mestre (VE).
- 33) Maria Grazia De Giorgi, Antonio Ficarella "Numerical Study And Experiments Of Cryogenic Cavitating Flows", **Festival dell'innovazione- Giornata Sulla Ricerca Nel Settore Aerospaziale In Puglia**, Bari 4 Dicembre 2008.
- 34) Maria Grazia De Giorgi, Antonio Ficarella, A. Leuzzi, "Study Of Supercritical Cryogenic Spray", **Festival dell'innovazione- Giornata Sulla Ricerca Nel Settore Aerospaziale In Puglia**, Bari 4 Dicembre 2008.
- 35) Maria Grazia De Giorgi, Antonio Ficarella "Simulation Of Cryogenic Cavitation By Using Both Inertial And Heat Transfer Control Bubble Growth", **AIAA 39th Fluid Dynamics Conference and Exhibit**, giugno 2009, San Francisco, USA, ISBN: 978-1-56347-975-5.
- 36) Maria Grazia De Giorgi, A. Leuzzi, "CFD Simulation Of Mixing And Combustion In Lox/Ch4 Spray Under Supercritical Conditions", **AIAA 39th Fluid Dynamics Conference and Exhibit**, giugno 2009, San Francisco, USA, ISBN: ISBN: 978-1-56347-975-5
- 37) Maria Grazia De Giorgi, Daniela Bello, Antonio Ficarella,
A "Analysis of Thermal Effects in a Cavitating orifice Using Rayleigh Equation and experiments", ***ASME Internationa Journal Of Gas Turbine And Power***, September 2010, Vol.132, pp. 092901-1, 092901-10. ISSN: 0742-4795
- B** Maria Grazia De Giorgi, Daniela Bello, Antonio Ficarella,
 "Analysis of Thermal Effects in a Cavitating orifice Using Rayleigh Equation and experiments", in collaborazione con D. Bello, A. Ficarella, **ASME CONFERENCE ICONE17**, Brussel 12-16 luglio 2009, Paper number ICONE17-75960.
- 38) Maria Grazia De Giorgi , Marco Tarantino, Antonio Ficarella, "An Experimental Investigations Of The Influence Of Thermal Effects On Inception Of Cavitation In Sharp-Edged Orifices", **ExHFT, 7th World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics**, Krakow, Poland, June 28 - July 03, 2009.

- 39) Maria Grazia De Giorgi, Maria Grazia Russo, Antonio Ficarella, "Short-term wind forecasting using artificial neural networks (ANNs)", **Second International Conference on Energy and Sustainability**, Bologna, Italy from 23 - 25 June 2009. ISBN: 978-1-84564-191-7. ***WIT Transactions on Ecology and the Environment***, Volume 121, 2009, Pages 197-208. ISSN: 17433541 ISBN: 978-184564191-7 DOI: 10.2495/ESU090181
- 40) Maria Grazia De Giorgi, Antonio Ficarella "Real Fluid Modelling of Supercritical Reacting Flows in Liquid Rocket Engine", **3rd European Conference For Aero-Space Sciences EUCASS 2009**, Versaille , luglio 2009.
- 41) Maria Grazia De Giorgi, Paolo Maria Congedo, Antonio Ficarella, "Prestazioni Di Una Fuel Cell A Servizio Di Un Edificio Civile", **64° Congresso Nazionale ATI** **64° Congresso Nazionale ATI**, Libreria Universitaria Benedetti (ITA), 64° Congresso Nazionale ATI, L'Aquila - Montesilvano (PE) 8-11 Settembre 2009, 2009, ISBN: 9788887182378
- 42) Maria Grazia De Giorgi, A. Cai, A. Paolo Carlucci, Gianpiero Colangelo A. De Luca Domenico Laforgia G. Minosi, A. Nuzzo, A. Scarpello, Giuseppe Starace, "Analisi e studi relativi all'ottimizzazione di un impianto di gassificazione e cogenerazione a biomasse lignocellulosiche", **64° Congresso Nazionale ATI**, Libreria Universitaria Benedetti (ITA), 64° Congresso Nazionale ATI, L'Aquila - Montesilvano (PE) 8-11 Settembre 2009, 2009, ISBN: 9788887182378
- 43) Maria Grazia De Giorgi, Paolo Maria Congedo, Leda Bonfantini, Simone Occhilupo, "Performance evaluation of horizontal air-ground heat exchangers for conditioning systems", **64° Congresso Nazionale ATI**, Libreria Universitaria Benedetti (ITA), L'Aquila - Montesilvano (PE) 8-11 Settembre 2009, ISBN: 9788887182378
- 44) Maria Grazia De Giorgi, Paolo Maria Congedo, Antonio Ficarella, "Stima Della Producibilità A Breve Termine Di Impianti Eolici Mediante Sistemi Statistico/Neurali", **64° Congresso Nazionale ATI**, Libreria Universitaria Benedetti (ITA), L'Aquila - Montesilvano (PE) 8-11 Settembre 2009, ISBN: 9788887182378
- 45) Maria Grazia De Giorgi, Daniela Bello, Antonio Ficarella, "Analisi dell'influenza degli effetti termici sulla formazione di flussi cavitanti in ugelli", **64° Congresso Nazionale ATI**, L'Aquila 8-11 settembre 2009, ISBN 8887182378.
- 46) Maria Grazia De Giorgi, Stefania Traficante, Antonio Ficarella, "Simulazione Numerica Del Controllo Attivo Del Flusso Tramite Attuatori Al Plasma", **65° Congresso Nazionale ATI**, Domus de Maria (CA), 13-17 Settembre 2010, ISBN 8890411635.
- 47) Maria Grazia De Giorgi, L. Tarantino, Antonio Ficarella, Domenico Laforgia, "Numerical modelling of high-pressure cryogenic sprays", **AIAA 40th Fluid Dynamics Conference and Exhibit**, 28 June-1July 2010, Hyatt Regency McCormick Place Chicago, Illinois, AIAA-2010-5007, 2010 AIAA Meeting Papers on Disc, Vol. 15, No. 6 (Fluids et al), ISBN: 978-1-60086-745-3.

- 48) Maria Grazia De Giorgi, Maria Giovanna Rodio, Antonio Ficarella, "Thermodynamic effect on cavitation in water and cryogenic fluids", **10th Biennial Conference on Engineering Systems Design and Analysis ESDA 2010**, Istanbul, 12-14 Luglio 2010. ASME 2010 10th Biennial Conference on Engineering Systems Design and Analysis, Volume 3, ISBN: 978-0-7918-4917-0
- 49) Maria Grazia De Giorgi, Marco Tarantino, Antonio Ficarella, "Comparisons of different wind forecasting systems", **10th Biennial Conference on Engineering Systems Design and Analysis ESDA 2010**, Istanbul, 12-14 Luglio 2010, Volume 1, ISBN: 978-0-7918-4915-6
- 50) Maria Grazia De Giorgi, Marco Tarantino, Antonio Ficarella "Error analysis of short term wind power prediction models", **Applied Energy 88 (2011)**, pp. 1298-1311. [doi:10.1016/j.apenergy.2010.10.035](https://doi.org/10.1016/j.apenergy.2010.10.035)
- 51) Maria Grazia De Giorgi, Marco Tarantino, Antonio Ficarella, "A new hybrid method for wind power forecasting based on wavelet decomposition and artificial neural networks", Paper No. GT2011-46382, **ASME 2011 Turbo Expo: Turbine Technical Conference and Exposition**, June 6-10, 2011, Vancouver, Canada, Volume 1: Aircraft Engine; Ceramics; Coal, Biomass and Alternative Fuels; Wind Turbine Technology, ISBN: 978-0-7918-5461-7
- 52) Maria Grazia De Giorgi, Stefania Traficante, Antonio Ficarella, "Performance Improvement Of Turbomachinery Using Plasma Actuators", Paper No. GT2011-46413, **ASME 2011 Turbo Expo: Turbine Technical Conference and Exposition**, June 6-10, 2011, Vancouver, Canada, Volume 7: Turbomachinery, Parts A, B, and C, ISBN: 978-0-7918-5467-9
- 53) Maria Grazia De Giorgi, Marco Tarantino, Antonio Ficarella "Performance evaluation of hybrid wind power forecasting models based on the wavelet decomposition techniques", **3rd International Conference on Applied Energy** - 16-18 May 2011 - Perugia, Italy, ISBN 9788890584305.
- 54) Maria Grazia De Giorgi, Antonio Ficarella, Marco Tarantino, "A data acquisition system to detect bubble collapse time and pressure losses in water cavitation", **International Journal of Measurement Technologies and Instrumentation Engineering**, 1(1),38-54, January-March 2011, ISSN: 2156-1737. DOI: 10.4018/ijmtie.2011010104
- 55) Maria Grazia De Giorgi, Stefania Traficante, Antonio Ficarella "Active Flow Control Using Plasma Actuators In Gas Turbine Engine", **XX International Symposium on Air Breathing Engines 2011 (ISABE 2011)**, September 12-16, 2011 Gothenburg, Sweden, ISBN: 9781618391803
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