Decreto Rettore Università di Roma "La Sapienza" n 3227/2021 del 02.12.2021

ALESSIO CASTORRINI
Curriculum Vitae

Rome
26/01/2022

Part I – General Information

Full Name	Alessio Castorrini
Spoken Languages	Italian, English

Part II – Education

Type	Year	Institution	Notes (Degree, Experience,…)
PhD	2017	Sapienza University of Rome	Ph.D. in Industrial Production Engineering. Title: "Development of Computational Aided Engineering tools for fluid-structure interaction and erosion in turbomachinery virtual prototyping"
Post-graduate studies	2015	TAFSM (Team for Advanced Flow Simulation and Modeling), international research team	Certificate of Attendance in "Computational Fluid-Structure Interaction", short course in Istanbul, Turkey (2015).
Post-graduate studies	2015	CINECA, Rome	Certificate of Attendance in "Introduction to scientific programming GPGPU and CUDA"
Post-graduate studies	2015	Sapienza University of Rome	Certificate of Attendance in "Corso di scrittura tecnico-scientifica" (Course in scientific-technical writing)
University graduation	2013	Sapienza University of Rome	(2 years) Master's degree in Aeronautical Engineering
University graduation	2009	Sapienza University of Rome	(3 years) Degree in Aerospace Engineering

Part III – Appointments

IIIA – Academic Appointments

Start	End	Institution	Position
01/08/2019	31/07/2022	School of Engineering, University of Basilicata	Research Associate (Ricercatore a Tempo Determinato – A). SC: 09/C1. SSD: ING-IND/09. Research programme: *Attraction*

			and International Mobility - proposta AIM 1859451-Attività 3- Area di Specializzazione "Energia" – Linea 2.1.
02/12/2019	30/11/2023	Department of Engineering, Lancaster University	Visiting Researcher
09/11/2017	31/07/2019	Department of Mechanical and Aerospace Engineering, Sapienza University of Rome	Research Associate (Assegnista di Ricerca). SSD: ING-IND/09.
01/12/2017	31/07/2019	Department of Mechanical and Aerospace Engineering, Sapienza University of Rome	Support and collaboration in EU Erasmus+ project: "WESET, Wind Engineering Skills in Egypt and Tunisia"
01/01/2018	31/07/2019	Department of Astronautical, Electrical and Energy Engineering, Sapienza University of Rome	Tutoring for "Advanced Energy Conversion Systems", course of the Master's degree in Energy Engineering
01/08/2016	31/10/2017	Department of Mechanical and Aerospace Engineering, Sapienza University of Rome	Post-graduate research fellow. Research fellowship
01/08/2015	29/10/2015	Faculty of Science and Engineering, Waseda University, Tokyo.	Visiting Researcher

IIIB – Other Appointments

Start	End	Institution	Position
2021	2022	Energies (peer-reviewed open access journal published online by MDPI)	Guest Editor for the Special Issue "Wind turbine advances"
2014	2017	SED - Soluzioni per l'energia e la diagnostica s.r.l., Spin-off of Sapienza University of Rome	Consultant Engineer.
			Activities:
			i) Preliminary mechanical and aerodynamic design of a MultiMW wind turbine blade and drivetrain system. Pubblication of Patent n. WO2016006008A1: "Joint for modular wind blade and modular wind blade comprising said joint", A. Castorrini, A. Corsini, F. Rispoli, F. Sciulli. (2016)
			ii) Aerodynamic analysis of industrial axial fan blades
			iii) Structural analysis and verification by standards of a steam piping system,
			iv) Structural analysis of fan rotors

			and blades
2016	2018	ASME Turbo Expo Conferences	Session Co-Chair

Part IV – Teaching experience

Year	Institution	Lecture/Course
2020-2022	School of Engineering, University of Basilicata	Course: Metodi agli elementi finiti per l'interazione fluido-struttura (6 CFU), at the MSc Mechanical Engineering (LM-33).
2019-2021	Facoltà di Ingegneria Civile e Industriale, Sapienza University of Rome	Course: Fluid-structure interaction (6 of 9 CFU), at the MSc Mechanical Engineering (LM-33) and MSc Double Degree Sapienza-Sorbonne: Computational Mechanics (CompMech).
2020-2021	School of Engineering, University of Basilicata	Course: Bases in Matlab for scientific computing, 16h course at the XXXVI cycle of PhD programme in "Engineering for Innovation and Sustainable Development"
2019-2020	School of Engineering, University of Basilicata	Course: Bases in Matlab and Python for scientific computing, 24h course at the XXXV cycles of PhD programme in "Engineering for Innovation and Sustainable Development"
2020	Department of Engineering, Lancaster University	Lecture: Prediction of the wind power resource using mesoscale and Computational Fluid Dynamics models (Seminar Programme 20 Minutes Of Engineering 2020/21)
2020	Department of Engineering, Lancaster University	Lecture: Computational methods for erosion damage and deposit prediction on turbomachinery blades (Lecture)
2019	Department of Mechanical and Aerospace Engineering, Sapienza University of Rome	8h Lessons in Wind energy: Technology, Mini- and Micro-, Offshore, at II level Master in Energy Effi-ciency and Renewable Energy Sources (EFER)
2018	Department of Mechanical and Aerospace Engineering, Sapienza University of Rome	12h Lessons in Wind energy: Technology, Design, Mini- and Micro-, Offshore, at II level Master EFER
2017	Department of Mechanical and Aerospace Engineering, Sapienza University of Rome	16h Lessons in Wind energy: Technology, Design, Repowering, Economical aspects, Mini- and Micro-, Offshore, at II level Master EFER
2017	Universidad Nacional del Sur, Bahia Blanca, Argentina	Lecture: Wind turbine blade design (in Erasmus+ project DIEGO – Development of quality system through Energy Efficiency cOurses)
2017	Department of Mechanical and Aerospace Engineering, Sapienza University of Rome	Lecture: Multibody aeromechanical simulation of wind turbines using NREL - FAST platform (in Tempus project

		JAMILA – Joint Master of Mediterranean Initiatives on Renewable and Sustainable Energy)
2016	Department of Mechanical and Aerospace Engineering, Sapienza University of Rome	12h Lessons in Wind energy: Technology, Design, Mini- and Micro-, Offshore, at II level Master EFER
2015	Department of Mechanical and Aerospace Engineering, Sapienza University of Rome	4h Lessons in Wind energy: Technology and design practices, at II level Master EFER
2015	TAFSM Laboratory, Waseda University, Tokyo	Lecture: Meshing in Computational Physics

Part V - Society memberberships, Awards and Honors

Year	Title
2021	Member of "OWEMES - Offshore Wind and other marine renewable Energies in Mediterranean and European Seas"
2019	Member of "AIMSEA - Associazione Italiana delle Macchine a fluido e dei Sistemi per l'Energia e l'Ambiente"
2017	Best paper award at ASME Turbo Expo 2016 (Seoul), paper title: "Numerical study on the passive control of the aeroelastic response in large axial fans".
2016	Member of "Fans & Blowers" committee at ASME Turbo Expo conferences from 2016 to 2018

Part VI - Funding Information [grants as PI-principal investigator or I-investigator]

Year	Title	Program	Grant value
2020	HPC1796WT3 - High-resolution prediction of wind turbine energy production using rotor-resolved and actuator line CFD simulation	HPC-Europa3 Programme of H2020 Research & Innovation GA # 730897	HPC computing resources (130000 core hours) and travel/visit expenses for 4-weeks at EPCC centre (Edinburgh, UK)

Part VII – Research Activities

Keywords	Brief Description
Wind energy, Annual energy production, leading edge erosion, Machine learning, CFD	Advancing the understanding of the aerodynamics of damaged wind turbine blades and its detrimental impact on turbine power generation. Development of novel intelligent data-driven cross-disciplinary technology to rapidly and reliably quantify the progression of wind farm energy losses using geometry, inspection, and operational data. Research in collaboration with the Engineering Department of Lancaster University.
Wind, Mesoscale, numerical weather prediction, CFD	Development of integrated methods for coupling numerical weather prediction (mesoscale models) and computational fluid dynamics of turbulent flows, in order to simulate, with high spatial resolution, the wind field over wind farms, and its interaction with wind turbines wakes and loads. Research in collaboration with IMAA – CNR
FEM, fluid-	Development and validation of stabilized finite element methods for

structure interaction, turbomachinery	computational fluid-structure interaction. Application to virtual prototyping of turbomachinery blades and control devices. Research in collaboration with Department of Mechanical and Aerospace Engineering at Sapienza University, and TAFSM research group at Waseda University of Tokyo.	
Particle tracking, erosion/deposit, mesh morphing, erosion/deposit profile evolution, machine learning, turbomachinery	Development and validation of numerical models and methods to simulate the erosion damage and particle deposition on turbomachinery blades. Coupling of turbulent flows modelling with particle tracking (PT) techniques based on single particle and particle clouds approaches. Definition of algorithms based on mesh morphing and scale-up methods for the prediction of the geometry evolution of turbomachinery blade under long term exposition to particle laden flows. Definition of surrogate models based on machine learning for the fast and reliable prediction of erosion damage on turbomachinery blades in operation. Research in collaboration with Department of Mechanical and Aerospace Engineering at Sapienza University, and TAFSM research group at Waseda University of Tokyo.	
HPC, wind turbine wakes, wind farm losses, actuator line	HPC simulation of wind turbine wakes with high-fidelity CFD and actuator line models. Use high-resolution CFD to investigate the accuracy of modern numerical approaches used to assess turbine power production and wake predictions, key to estimate wind farm power losses due to rotor/wake interactions. Research in collaboration with the Engineering Department of Lancaster University.	

Part VIII – Summary of Scientific Achievements

Product type	Number	Data Base	Start	End
Papers [international]	30	Scopus	2015	2022

Total Impact factor (Data Base: Web of Science, total computed by IRIS/UGOV)	39.40
Total Citations (Data Base: Scopus)	257
Average Citations per Product	8.57
Hirsch (H) index	9
Normalized H index*	1.125

*H index divided by the academic seniority.

Part IX– Selected Publications

List of the publications selected for the evaluation. For each publication report title, authors, reference data, journal IF (if applicable), citations, press/media release (if any).

#	Document title	Authors	Year	Journal	Impact Factor (Web of Science)	Cited by (Scopus)
01	Machine learnt prediction method for rain erosion	Castorrini, A.; Venturini, P.; Corsini,	2021	WIND ENERGY	2.73	3

	damage on wind turbine blades	A.; Rispoli, F.				
02	Machine learning-enabled prediction of wind turbine energy yield losses due to general blade leading edge erosion	Cappugi, L.; Castorrini, A.; Bonfiglioli, A.; Minisci, E.; Campobasso, M. S.	2021	ENERGY CONVERSION AND MANAGEMENT	9.709	1
03	Increasing spatial resolution of wind resource prediction using NWP and RANS simulation	Castorrini, A.; Gentile, S.; Geraldi, E.; Bonfiglioli, A.	2021	JOURNAL OF WIND ENGINEERING AND INDUSTRIAL AERODYNAMICS	4.082	2
04	Experimentally validated three-dimensional computational aerodynamics of wind turbine blade sections featuring leading edge erosion cavities	Campobasso, M. S.; Castorrini, A.; Cappugi, L.; Bonfiglioli, A.	2021	WIND ENERGY	2.73	1
05	Simulation of the deposit evolution on a fan blade for tunnel ventilation	Castorrini, A.; Venturini, P.; Corsini, A.; Rispoli, F.	2020	JOURNAL OF ENGINEERING FOR GAS TURBINES AND POWER	1.804	2
06	Computational analysis of particle-laden-airflow erosion and experimental verification	Castorrini, A.; Venturini, P.; Corsini, A.; Rispoli, F.; Takizawa, K.; Tezduyar, T. E.	2020	COMPUTATIONAL MECHANICS	4.014	9
07	A stabilized ALE method for computational fluid-structure interaction analysis of passive morphing in turbomachinery	Castorrini, A.; Corsini, A.; Rispoli, F.; Takizawa, K.; Tezduyar, T. E.	2019	MATHEMATICAL MODELS AND METHODS IN APPLIED SCIENCES	3.044	22
08	Numerical simulation of the blade aging process in an induced draft fan due to long time exposition to fly ash particles	Castorrini, A.; Venturini, P.; Corsini, A.; Rispoli, F.	2019	JOURNAL OF ENGINEERING FOR GAS TURBINES AND POWER	1.804	13
09	Computational analysis of performance deterioration of a wind turbine blade strip subjected to environmental erosion	Castorrini, A.; Corsini, A.; Rispoli, F.; Venturini, P.; Takizawa, K.; Tezduyar, T. E.	2019	COMPUTATIONAL MECHANICS	3.459	34
10	Numerical testing of a trailing edge passive morphing control for large axial fan blades	Castorrini, A.; Corsini, A.; Sheard, A. G.; Rispoli, F.	2018	JOURNAL OF ENGINEERING FOR GAS TURBINES AND POWER	1.653	6
11	Computational analysis of wind-turbine blade rain erosion	Castorrini, A.; Corsini, A.; Rispoli, F.; Venturini, P.; Takizawa, K.; Tezduyar, T. E.	2016	COMPUTERS & FLUIDS	2.313	62
12	Assessing wind turbine energy losses due to blade leading edge erosion cavities with parametric CAD and 3D CFD	Castorrini, A.; Cappugi, L.; Bonfiglioli, A.; Campobasso, M. S.	2020	JOURNAL OF PHYSICS. CONFERENCE SERIES	NA	3

Roma, 26/01/2022

Alessio Castorrini