PERSONAL INFORMATION
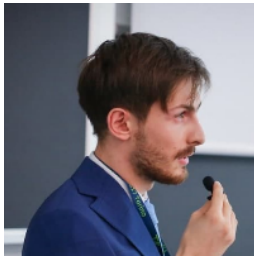
Fabrizio De Caro

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Gender Male | Date of birth 08/06/1992 | Nationality Italian

About me Smart, in love with the challenge of innovation. I believe in team working but I am not avoiding individual challenges. I am able to speak in public, even in front of large audience, for example for international conferences and meetings.

WORK EXPERIENCE

June 2020 – Present

Post-Doctoral Researcher Fellow

Sannio University, Power System Research Group – Benevento, Italy

I am currently involved in the following activities:

▷ (2019 – present) – Working in a research team carrying out model development for enhancing the renewable energy integration in power systems;

▷ (2020 – present) – Secretary of the *IEEE* Task Force on *Methods for Analysis and Quantification of Power System Resilience*;

▷ (2021) – (*PNRM ITER* Project – CDRL N: Lotto 1, C.N. 20542) Management tool of HV grid power flows for military facilities.

▷ (2019 – present) – Characterisation and impact analysis of wind power generation on power grids for *Terna Rete Italia* (*ST82* Project);

▷ (2019 – present) – Wind Power Forecasting framework development for an Italian Energy Company with the collaboration of the *Centro Italiano Ricerche Aerospaziali* (*CIRA*)

▷ (2019 – present) – Teaching and examination activities in *Power Systems* and *Power System planning and management* courses.

▷ (2019 – present) – Reviewer for scientific journals: *IEEE Trans. on Smart Grids/ Power Systems/ Sustainable Energy*, *MDPI Energies/ Electronics/ Sustainability*, *Springer - Technologies and Economics of Smart Grids*

Main Research activities: Reliability and Resilience of Power Systems; Wind Energy Systems; Machine Learning and Data Analysis; Probabilistic and Stochastic modeling; Multi-Objective optimization based making decision tool developing; Electricity Market strategy development

Current Research Collaborations:

▷ *Machine Learning Group, Université Libre de Bruxelles*: Prof. G. Bontempi, J. De Stefani, G.P. Paldino

▷ *UCD School of Electrical and Electronic Engineering, The University College of Dublin*: Prof. F. Milano

▷ *Energy Systems, The University of Edinburgh*: Prof. S. Djokic

EDUCATION AND TRAINING

December 2016 – April 2020

PhD in Information Technologies for Engineering   Excellent

Sannio University, Power System Reserach Group – Benevento, Italy

Thesis title: Enhancing grid flexibility by proactive decision support systems.

Supervisors: Prof.s D. Villacci, A. Vaccaro

I was involved in the following activities:

▷ (2020) – Contributor to Knowledge Discovery Processes in power system for the IEEE task force "Enabling Paradigms for High-Performance Computing in Wide Area Monitoring Protective and Control Systems"
▷ (2019) – Effect assessment of the electric network-railway systems integration for the TERNA rete Italia and Rete Ferrovie Italiane
▷ (2019) – Power grid resilience analysis for TERNA Rete Italia
▷ (2018) – Report on the current wind power forecasting frameworks for the European Project *Optimal System-Mix of flexibility Solutions for European Electricity (OSMOSE)*
▷ (2018) – Data driven condition monitoring tool development for wind power generators
▷ (June 2018) – Summer School on Smart Grid, Unisa
▷ (Septmber 2018) – Advanced Course Electrical load management, forecasting and control, Polito

April - August 2019 | **Visiting PhD Student**

Université Libre de Bruxelles, Machine Learning Group – Bruxelles, Belgium

Data driven wind power forecasting model development and performance analysis.

Supervisor: Prof. G.Bontempi

December 2014 – October 2016 | **Master Degree in Energy Engineering** | 110&L / 3.88 GPA

Sannio University, Power System Research Group – Benevento, Italy

Thesis title: | Spatial and temporal wind and power forecasting by knowledge discovery on big data

Thesis developed with the collaboration of Terna Rete Italia *

Supervisors: D. Villacci, A. Vaccaro, Advisors: E.M. Carlini*, G.M. Giannuzzi*, C.Pisani*

September 2011 – December 2014 | **Bachelor Degree in Energy Engineering** | 110&L / 3.77 GPA

Sannio University, Power System Research Group – Benevento, Italy

Thesis title: | Physical downscaling of weather forecasts for wind power forecasting

Supervisors: D. Villacci, Advisors: C.Pisani

2020 – Present | **Enrolled at Association of Engineers**

Avellino, no. 3055 – section A.

Awards

September 2020 | $55th$ UPEC Conference Top 5% papers

PERSONAL SKILLS

Mother tongue | Italian

Other languages

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	
B2	B2	B2	B2	B2

(English row)

Communication skills | – I am able to expose my reasoning and results to the public.

Organisational / managerial skills | – Leadership and good experience in managing a group of people, achieved in several research projects and as supervisors of degree thesis.

Job-related skills | – Problem solving
– Get results
– Multitask

Digital competences	SELF-ASSESSMENT				
	Information Processing	Content creation	Communication	Problem solving	Safety
	Proficient user	Proficient user	Proficient user	Proficient user	Proficient user

Digital competences - Self-assessment grid

Computer skills
— Basic: Python, C.
— Intermediate: Linux OS, Mac OS, GIS, Image Editing
— Advanced: R, Matlab and MatPower, LaTeX, Suite Office, Windows OS, One Note, Slack, Team Viewer.

Driving licence B

EXTRA-CURRICULARIES ACTIVITIES

Accepted and Published Scientific Publications

▷ G. M. Paldino, J. De Stefani, F. De Caro, and G. Bontempi. Does automl outperform naive forecasting? In *Engineering Proceedings*, volume 5, page 36. Multidisciplinary Digital Publishing Institute, 2021

▷ F. De Caro, J. De Stefani, G. Bontempi, A. Vaccaro, and D. Villacci. Robust assessment of short-term wind power forecasting models on multiple time horizons. *Technology and Economics of Smart Grids and Sustainable Energy*, 5(1):1–15, 2020c

▷ F. De Caro, A. Vaccaro, and D. Villacci. A reliable multi-objective methodology for strategic bidding of wind energy. In *2020 55th International Universities Power Engineering Conference (UPEC)*, pages 1–6. IEEE, 2020d

▷ E. Brugnetti, G. Coletta, F. De Caro, A. Vaccaro, and D. Villacci. Enabling methodologies for predictive power system resilience analysis in the presence of extreme wind gusts. *Energies*, 13(13):3501, 2020

▷ F. De Caro, A. Andreotti, R. Araneo, M. Panella, A. Vaccaro, and D. Villacci. A review of the enabling methodologies for knowledge discovery from smart grids data. In *2020 IEEE International Conference on Environment and Electrical Engineering and 2020 IEEE Industrial and Commercial Power Systems Europe (EEEIC/I&CPS Europe)*, pages 1–6. IEEE, 2020b

▷ F. De Caro, A. Andreotti, R. Araneo, M. Panella, A. Rosato, A. Vaccaro, and D. Villacci. A review of the enabling methodologies for knowledge discovery from smart grids data (extended version). *Energies*, pages 1–6, 2020a

▷ F. De Caro, A. Vaccaro, and D. Villacci. Adaptive wind generation modeling by fuzzy clustering of experimental data. *Electronics*, 7(4):47, 2018a

▷ F. De Caro, E. Carlini, and D. Villacci. Flexibility sources for enhancing the resilience of a power grid in presence of severe weather conditions. In *2019 AEIT International Annual Conference (AEIT)*, pages 1–6. IEEE, 2019a

▷ F. De Caro, A. Vaccaro, and D. Villacci. A markov chain-based model for wind power prediction in congested electrical grids. *The Journal of Engineering*, 2019(18):4961–4964, 2019c

▷ F. De Caro, A. Vaccaro, and D. Villacci. Integrating reliability models and adaptive algorithms for wind power forecasting. In *Advances in System Reliability Engineering*, pages 117–130. Elsevier, 2019b

▷ F. De Caro, A. Vaccaro, and D. Villacci. A probabilistic-based methodology for wind power forecasting considering generator reliability. In *2018 IEEE Power & Energy Society General Meeting (PESGM)*, pages 1–5. IEEE, 2018b

▷ F. De Caro, A. Vaccaro, and D. Villacci. The role of principal component analysis in neural-based wind power forecasting. In *2017 IEEE PES Innovative Smart Grid Technologies Conference Europe (ISGT-Europe)*, pages 1–6. IEEE, 2017a

▷ F. De Caro, A. Vaccaro, and D. Villacci. Spatial and temporal wind power forecasting by case-based reasoning using big-data. *Energies*, 10(2):252, 2017b

Ongoing Review

▷ F. De Caro, A. Pepiciello, F. Milano, and A. Vaccaro. Coherence analysis of power grids in the presence of faults, b

▷ A. Pepiciello, F. De Caro, and A. Vaccaro. Enabling demand response programs for reducing greenhouse gas emissions by optimal real-time pricing

▷ F. De Caro, J. De Stefani, A. Vaccaro, and G. Bontempi. Daft-e : Feature-based multivariate and multi-step-ahead wind power forecasting, a

Advisor activities

▷ G. Mustone, A. Vaccaro, and F. De Caro. Connection criteria of renewable power plants to the transmission power grid. Master's thesis, Power System Research Group, Sannio University, 2021

▷ A. Porcaro, A. Vaccaro, and F. De Caro. Technical and economic impact of electric energy storage systems for wind power plants. Master's thesis, Power System Research Group, Sannio University, 2021

▷ L. Giusti, A. Vaccaro, and F. De Caro. Analysis of the italian ancillary services market. Bachelor's thesis, Power System Research Group, Sannio University, 2021

▷ M. Rinaldi, A. Vaccaro, and F. De Caro. Literature review of data-driven based electricity price forecasting models. Bachelor's thesis, Power System Research Group, Sannio University, 2021

▷ P. Pallotta, A. Vaccaro, and F. De Caro. Machine learning based techniques for electricity price forecasting. Master's thesis, Power System Research Group, Sannio University, 2020

▷ M. Minicozzi, A. Vaccaro, and F. De Caro. Adaptive ensemble forecasting strategies for data-driven wind power forecasting. Bachelor's thesis, Power System Research Group, Sannio University, 2020

▷ D. Colangelo, A. Vaccaro, and F. De Caro. Machine learning based spatial and temporal wind power generation profile analysis. Bachelor's thesis, Power System Research Group, Sannio University, 2020

▷ R. Bruno, A. Vaccaro, and F. De Caro. Data-driven wind power generator model based on machine learning techniques. Bachelor's thesis, Power System Research Group, Sannio University, 2020

▷ A. Restelli, D. Villacci, E. M. Carlini, G. Coletta, and F. De Caro. Improvements of the resilience in electrical grid in presence of severe weather conditions. Master's thesis, Power System Research Group, Sannio University, 2019

▷ M. Verdile, D. Villacci, E. M. Carlini, S. D'Alfonso, G. Coletta, and F. De Caro. Power quality: minimization of voltage drops in the electrical and railway systems integration. Master's thesis, Power System Research Group, Sannio University, 2019

▷ M. Colella, A. Vaccaro, and F. De Caro. Qualifying methodologies for the renewable energy sources participation in ancillary services market. Master's thesis, Power System Research Group, Sannio University, 2018

▷ A. Castiello, A. Vaccaro, and F. De Caro. An expert system for the optimal bidding strategies in the electricity market. Master's thesis, Power System Research Group, Sannio University, 2018