



Antonio Luchetta

Date of birth: 01/10/1964 | **Nationality:** Italian | **Phone number:**

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Address: Via S. Marta 3, 50139, Firenze, Italy (Work)

WORK EXPERIENCE

01/11/2001 – CURRENT Firenze, Italy

ASSOCIATE PROFESSOR UNIVERSITÀ DEGLI STUDI DI FIRENZE

Research activity on Electrical Simulators, Diagnosis/Prognosis, Machine learning, Neural Networks and applications

Electrical Engineering Area Courses

01/11/1995 – 31/10/2001 Potenza, Italy

ASSISTANT PROFESSOR UNIVERSITÀ DEGLI STUDI DELLA BASILICATA

EDUCATION AND TRAINING

01/11/1983 – 05/11/1993 Firenze, Italy

MS DEGREE IN ELECTRONIC ENGINEERING University of Firenze

Address Via Santa Marta 3, 50139, Firenze, Italy

LANGUAGE SKILLS

Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH			B1	B1	B2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

DIGITAL SKILLS

Microsoft Office | Google Drive | C C++ C | Fortran Language | Programming Languages: C, C++, Python, Matlab | Electrical Circuit Simulators: PSpice, SapWin | Machine Learning (Neural Networks)

ADDITIONAL INFORMATION

CONFERENCES AND SEMINARS

Recent works presented in Conferences

- M. Bindi, F. Grasso, A. Luchetta and M. C. Piccirilli, "A New Application of Power Line Communication Technologies: Prognosis of Failure in Underground Cables," 2022 International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME), Maldives, Maldives, 2022, pp. 1-6, doi: 10.1109/ICECCME55909.2022.9988118.
- Bindi, Marco; Garcia, Carlos Iturrino; Luchetta, Antonio; Grasso, Francesco; Piccirilli, MC, 2022 Classification of Power Quality disturbances using Multi-Valued Neural Networks and Convolutional Neural Networks. DOI: 10.1109/IJCNN55064.2022.9892536. In 2022 International Joint Conference on Neural Networks (IJCNN) - ISBN: 978-1-7281-8671-9

- M. Bindi et al., "Classification of Power Quality disturbances using Multi-Valued Neural Networks and Convolutional Neural Networks," 2022 International Joint Conference on Neural Networks (IJCNN), Padua, Italy, 2022, pp. 01-08, doi: 10.1109/IJCNN55064.2022.9892536.
- M. Bindi, A. Luchetta, L. Paolucci, F. Grasso, S. Manetti and M. C. Piccirilli, "Applications of Machine Learning Techniques for the Monitoring of Electrical Transmission and Distribution lines," 2022 18th International Conference on Synthesis, Modeling, Analysis and Simulation Methods and Applications to Circuit Design (SMACD), Villasimius, Italy, 2022, pp. 1-4, doi: 10.1109/SMACD55068.2022.9816290.
- Belardi, R., Bindi, M., Grasso, F., Luchetta, A., Manetti, S., Piccirilli, M.C. Thermal monitoring of underground medium voltage cables based on machine learning techniques(2021) Journal of Physics: Conference Series, 2022 (1), art. no. 012007, DOI: 10.1088/1742-6596/2022/1/012007
- Talluri, G., Bindi, M., Luchetta, A., Grasso, F., Luchetti, L., Paolucci, L. Analysis of Power Losses due to Magnetic Shielding for Electric Vehicle Wireless Charging(2021) 2021 IEEE 15th International Conference on Compatibility, Power Electronics and Power Engineering, CPE-POWERENG 2021, DOI: 10.1109/CPE-POWERENG50821.2021.9501223
- Bindi, M., Luchetta, A., Scarpino, P.A., Piccirilli, M.C., Grasso, F., Sturchio, A. Assessment of the health status of Medium Voltage lines through a complex neural network(2021) 2021 AEIT International Annual Conference, AEIT 2021
- Belardi, R., Bindi, M., Grasso, F., Luchetta, A., Manetti, S., Piccirilli, M.C. A complex neural classifier for the fault prognosis and diagnosis of overhead electrical lines(2020) IOP Conference Series: Earth and Environmental Science, 582 (1), art. no. 012001,
- Aizenberg, I., Bindi, M., Grasso, F., Luchetta, A., Manetti, S., Piccirilli, M.C. Testability Analysis in Neural Network Based Fault Diagnosis of DC-DC Converter(2019) 5th International Forum on Research and Technologies for Society and Industry: Innovation to Shape the Future, RTSI 2019 - Proceedings, art. no. 8895583, pp. 265-268.

PUBLICATIONS

Recent Publications on Int. Journals

- M. Bindi, A. Luchetta, G. M. Lozito, C. F. M. Carobbi, F. Grasso and M. C. Piccirilli, "Frequency Characterization of Medium Voltage Cables for Fault Prevention through Multi-Valued Neural Networks and Power Line Communication Technologies," in *IEEE Transactions on Power Delivery*, doi: 10.1109/TPWRD.2023.3270128.
- Bindi, M., Corti, F., Aizenberg, I., Grasso, F., Lozito, G.M., Luchetta, A., Piccirilli, M.C., Reatti, A. Machine Learning-Based Monitoring of DC-DC Converters in Photovoltaic Applications, (2022) *Algorithms*, 15 (3), art. no. 74.
- M. Bindi et al., "Failure Prevention in DC-DC Converters: Theoretical Approach and Experimental Application on a Zeta Converter," in *IEEE Transactions on Industrial Electronics*, vol. 70, no. 1, pp. 930-939, Jan. 2023, doi: 10.1109/TIE.2022.3153827.
- Talluri, G., Lozito, G.M., Grasso, F., Iturrino Garcia, C., Luchetta, A., Optimal battery energy storage system scheduling within renewable energy communities, (2021) *Energies*, 14 (24), art. no. 8480.
- Aizenberg, I., Belardi, R., Bindi, M., Grasso, F., Manetti, S., Luchetta, A., Piccirilli, M.C., A neural network classifier with multi-valued neurons for analog circuit fault diagnosis, (2021) *Electronics (Switzerland)*, 10 (3), art. no. 349, pp. 1-18.
- Aizenberg, I., Belardi, R., Bindi, M., Grasso, F., Manetti, S., Luchetta, A., Piccirilli, M.C. Failure prevention and malfunction localization in underground medium voltage cables(2021) *Energies*, 14 (1), art. no. 85, .
- Piccirilli, M.C., Grasso, F., Luchetta, A., Manetti, S., Reatti, A. Simulation of pulse width modulation DC-DC converters through symbolic analysis techniques(2021) *Advances in Science, Technology and Engineering Systems*, 6 (1), pp. 275-282.
- Garcia, C.I., Grasso, F., Luchetta, A., Piccirilli, M.C., Paolucci, L., Talluri, G. A comparison of power quality disturbance detection and classification methods using CNN, LSTM and CNN-LSTM(2020) *Applied Sciences (Switzerland)*, 10 (19), art. no. 6755, pp. 1-22.

RESEARCH SKILL

Research Topics

Analog circuit numerical and symbolic Simulation
 Machine Learning and Neural Networks
 Fault Diagnosis and Prognosis
 Electrical Networks and Smart Grids

Research lines

Dr. Luchetta is a researcher in the scientific disciplinary sector of Electrical Engineering, who has dealt with numerous topics, aspects and applications related to two main areas over the years of his career: the

analog circuit simulation and the theory of neural networks and their application to several electronic and electrical (but also hydraulic and environmental) engineering projects. In the field of the simulation of electrical systems, he has developed in particular symbolic simulators which, by their very nature, lend themselves to addressing problems of identification, inversion, evaluation of testability, diagnosis and classification of faults in analog circuits, both linear and non-linear, both time-invariant and time-varying. He is co-founder and programmer of the symbolic simulation software SapWin©, used for years in numerous academic and industrial contexts. In the field of neural networks, he is responsible for a scientific collaboration agreement with the Dept. of Computer Science of Manhattan College of New York, for the development of a particular class of complex-valued neural networks (the Multi-valued Neural Networks), which are excellently suited for use in classification and regression problems related to electrical quantities.
