

Paolo DI BARBA



Paolo Di Barba (DSc, PhD) is a full professor of electrical engineering at the University of Pavia, Italy, where he leads a group of young scientists active in the area of computational electromagnetics. Moreover, he has a position of visiting professor at the Lodz University of Technology (Poland), International Faculty of Engineering.

His scientific interests are focused on the analysis and synthesis of electric and magnetic fields, with special emphasis on evolutionary algorithms for inverse problems and optimisation. In this area, in the nineties he has been one of the pioneering researchers who contributed to apply the theory of Pareto-like optimality in computational electromagnetics.

At the time being, the core activity is focused on advanced numerical methods for field analysis and field synthesis. The former include finite-element method (FEM) for multiphysics non-linear analysis and, more recently, virtual-element method (VEM) which extends the capabilities of FEM to polygonal and polyhedral elements. In turn, the latter include multiobjective evolutionary computing for solving non-linear inverse problems and, more recently, optimization methods for high-dimensionality objective spaces. Presently, neural meta-modelling of fields based on convolutional networks is an emerging area in his research projects. Applications cover the automated optimal design of induction heating devices for electromagnetic processing of materials, permanent-magnet motors for electric vehicles, wearable antennas for wireless body area networks.

As far as publications are concerned, he is author or co-author of more than 200 papers, presented to international conferences or published in international journals. In particular, he is co-editor of the book "Optimal Shape Design Exploiting Metamaterials and 3D Printing" (The Institution of Engineering and Technology, in press), a co-author of the monograph "MEMS Field Models and Optimal Design" (Springer, 2019), the author of the monograph entitled "Multiobjective Shape Design in Electricity and Magnetism" (Springer, 2010), and a co-author of the textbook "Field Models in Electricity and Magnetism" (Springer, 2008).

For his scientific achievements, in 2021 the President of Poland conferred him the title of Professor, the highest academic award.

He is active also in the area of know-how transfer to the industrial world. In this respect, he was a scientific consultant of former Infolytica Corporation (Montreal, Canada), now a part of Siemens, for the development of a code devoted to the automated optimal design of electromagnetic devices, based on the finite-element method for the field analysis. Moreover, he is a scientific consultant of the ABB Corporate Research Centre (Baden, Switzerland) in the area of thermal and dielectric design of power transformers.