

ACADEMIC CURRICULUM

PAOLO GARDONIO

Paolo Gardonio was born in Pordenone – Italy, in 1966.

He graduated in Mechanical Engineering from Università di Padova, Italy, in 1991. He then continued his research studies in Applied Mechanics and received a PhD in 1995.

He joined the Institute of Sound and Vibration Research at the University of Southampton (UK) in 1995 as a Research Fellow. He was promoted to Lecturer in 1999, then to Senior Lecturer in 2002 and to Professor of Systems Dynamics and Control in 2006. Also, he was visiting professor at Università di Ferrara from 2003 to 2008.

In December 2009, he moved to the University of Udine in Italy as Professore Ordinario in the area ING-INF/04 "Automatica".

Over the years, he has taught the following modules: 1) Controlli Automatici, 2) Advanced Measurement Techniques, 3) Regolazione e Controllo in Tempo Reale, 4) Active Control of Noise and Vibration, 5) Systems Dynamics, 6) Finite Element Vibration Analysis.

Also, he has tutored/co-tutored 50 MSc final projects, 26 PdD research projects and 9 post-doctoral research projects.

During the period 1999-2009 he was the coordinator of the "European Doctorate in Sound and Vibration Studies"; a Marie Curie programme, which supported the PhD of 126 young researchers at ten European University Centres: ISVR Southampton (UK), Università di Ferrara (I), INSA Lyon (F), KUL Leuven (B), Trinity College Dublin (IRL), Technical University of Denmark (DK), Technical University of Berlin (D), KTH Stockholm (SE).

Also, during the period 2012-2016, he was coordinator of the "Dottorato di Ricerca in Ingegneria Industriale e dell'Informazione" at the University of Udine.

Finally, from 2015 to 2020 he was the University of Udine representative for the collaborations with the International Centre for Mechanical Sciences CISM where, between 2017 and 2020 he acted as deputy Secretary General.

He has been involved in research projects focused on the theory and practical implementation of active control of sound and vibration systems. In particular, he has focused his research activities on:

- active vibration and noise control with SISO and MIMO filtered-x LMS (FIR) feed-forward control architectures;
- smart structures with electromagnetic and piezoelectric transducers for feedback structural-acoustic control;
- miniaturised point sensors, built with MEMS technology, for smart structures;
- distributed sensors, using shaped piezoelectric films and patches, for smart structures;
- small-scale electromagnetic inertial transducers for smart structures;
- shunted electromagnetic and piezoelectric transducers for tuneable vibration absorbers;
- vibration energy harvesting for self-powered transducers in control systems;

- centralised, distributed, decentralised feedback vibration control;
- time-varying vibration control architectures;
- extremum seeking algorithms for the optimal tuning of vibration absorbers;
- tuneable in-vacuo chain-mail fabrics for smart materials and systems;
- digital twins of mechanical systems based on augmented Kalman filters;
- structural and acoustic modelling using direct/inverse electro-mechanical analogies and using mobility-impedance mechanical approaches;
- vibration and sound radiation measurements with camera arrays;
- structural and acoustic measurement and modelling in terms of structural power and acoustic intensity parameters respectively;
- modelling and control of vibro-acoustic response due to turbulent boundary layer (TBL) flow on the surface of single or double partitions;
- synthesis of excitations with temporal and spatial stochastic distribution (Turbulent Boundary Layer and Diffuse Sound Field) with feed-forward physical systems.

His research activities have resulted in a total of **363 scientific publications** with **115 articles in high-Q international journals**, which received a total of **4930 citations** with an **H-index** of **38** (from Scopus database).

Also, he has co-authored with Prof. F.J. Fahy a popular monograph on Sound and Structural Vibration and has published two highly cited review papers: "On the origins and development of mobility and impedance methods in structural dynamics" (in JSV) and "*A review of active techniques for aerospace vibration and noise control.*" in (AIAA Journal of Aircraft)

He was cited in the database of 100,000 top scientists presented in PLOS BIOLOGY. J. P. A. Ioannidis *et al.* "A standardized citation metrics author database annotated for scientific field PLOS BIOLOGY" <https://doi.org/10.1371/journal.pbio.3000384>

In 2001 he was the recipient of the Kenneth Harris James Prize awarded by the Aerospace Industries Division Board of the Institution of Mechanical Engineers (UK) for the scientific article "A panel with matched PVDF volume velocity sensor and uniform force actuator pair for the active control of sound transmission".

He has been invited to give 37 public talks at national and international conferences, workshops and courses.

Since 2010 he is Associate Editor of the scientific journal CEAS AERONAUTICAL JOURNAL and since 2015 he is Associate Editor of the scientific journal ACTA ACUSTICA united with ACUSTICA. Also, he is a regular member of the Scientific Committee of the International Conference on Noise and Vibration Engineering (ISMA) conference, which is organised every other year by the Katholieke Universiteit Leuven (BE).

He has been in charge for the **technical implementation and the administration of 35 research projects** (18 as principal investigator and 17 as co-investigator) funded by MIUR-PRIN, EPSRC, Royal Society, European Community, British Council, Regione FVG and Industres, with a local financing of more than 5 M€.

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