



Prof. Eugenio BRUSA, Ph.D.
Professor of Machine Design

Director of the Doctorate School of the Politecnico di Torino

Bio-sketch of Prof. Eugenio Brusa

Studies

- ⊖ He graduated as **Aeronautical Engineer** (Laurea, equivalent to B.Sc. + M.Sc.), at the Politecnico di Torino, in 1993.
- ⊖ He received the **Ph.D. in Machine Design**, at the Dept. of Mechanics of the same university, in 1997, under the supervision of Prof. Giancarlo Genta, and with a thesis on the design of an active stabilization of free rotors in the frame of a project of the Italian Space Agency (Satellite Galileo Galilei).

Appointments

- ⊖ Since 1998 to 2001, he was **Assistant Professor of Machine Design** (formally Mechanical Design and Machine Construction, in Italy) at the Dept. of Mechanics, Politecnico di Torino:
 - ⊖ head of the **Laboratory of Rotor Spinning Test**;
 - ⊖ he participated to the foundation of the **Departmental Laboratory of Mechatronics** (1993).
- ⊖ Since 2001 to 2008, he was with the University of Udine (Italy), at the Dept. of Electrical, Mechanical Engineering, as an **Associate Professor** (appointment 2002):
 - ⊖ he was **Technical Coordinator of the Master in "Project Management and Systems Engineering"**, at the Faculty of Engineering (2005-2007), performed in partnership with the Danieli Group;
 - ⊖ he contributed to the creation of the **"TechUd" Laboratory** focused on the Ubiquitous and Pervasive technologies, of the University of Udine, in collaboration with Eurotech, and he was coordinator of the Mechatronic Section.
- ⊖ Since 2008, he belongs to the Dept. of Mechanical and Aerospace Engineering of the Politecnico di Torino. He was appointed **Full Professor of Machine Design**, running in this role in 2013, as soon as the turnover allowed:
 - ⊖ he is lecturer of:
 - ⊖ Fundamentals of Machine Design and Drawing (B.Sc., Mech. Eng., in Italian),
 - ⊖ Machine Design (M.Sc., Mech. Eng. and Energy and Nuclear Eng., in English),
 - ⊖ Tools and applications of Systems Engineering (Ph.D., in English)
 - ⊖ Structural Mechatronics (Ph.D., in English)
 - ⊖ and former professor of Fundamentals of Strength of Materials (B.Sc., Mech. Eng., in English).

Institutional roles

- ⊖ 2015 - 2018: he was elected **Coordinator of the B.Sc. and M.Sc. degrees in Mechanical Engineering** (national path taught in Italian and international one taught in English);
- ⊖ 2018 - 2021: he is elected **Director of the Doctorate School of the Politecnico di Torino**

Research paths and roles

- ⊖ The research activities performed, since 1993, can be classified into three main paths:
 - ⊖ **Structural mechanical design**: dynamic design of structures, rotors and engine components; design against fatigue and thermomechanical fatigue; diagnosis, monitoring and testing of bearings, machine elements and industrial equipment; design of space structures as solar sails (Aurora Sail) and satellites (Galileo); design, dynamics and control of equipment for steelmaking as cold and hot rolling mills, furnaces, shredder hammers, flying cutters; numerical modelling via FEM and multibody dynamics.
 - ⊖ **Structural mechatronics and micromechatronics**: design of self-sensing piezoelectric transducers and structures, active magnetic bearings and suspension, active magnetic dampers; dynamics and control of a motor vehicle; design of MEMs (Micro Electro Mechanical Systems) and RF-MEMs (Radio Frequency Electro Mechanical Systems); design, optimization and fracture prevention of vibration energy harvesters based on capacitive MEMS and piezoelectric layers.



- ⊖ **Model Based Systems Engineering**: development of the MBSE within mechatronics, aerospace, mechanical systems design; interoperability of functional and physical modelling tools; industrial application SysML and newer languages; early dysfunction analysis of systems and integration with RAMS. Experimental validation. Industrial digitalization of Life Cycle Product development and integration Additive Manufacturing.
- ⊖ He founded and currently leads a research group active with the **Systems Engineering and Design (ISED)**, applied to industry, smart manufacturing and products.

Scientific production

- ⊖ He wrote more than **230 papers**, either published on scientific journals or presented to international conferences.
- ⊖ He is co-author of **some** as **Microsystem Mechanical Design** (Springer, 2006), **MEMS: Technology, Fabrication Processes and Applications** (Nova Science, 2010) and even editor of **Microelectronics: Principles, Technologies and Applications** (Nova Science, 2015).
- ⊖ He recently wrote **two books**, one on structural mechatronics, being **Mechanica Strutturale: Sistemi e Tecnologie** (CET, 2016), in Italian, and one **Systems Engineering and Its Application to Industrial Product Development** (Springer, 2018).

Editorial activity

- ⊖ He is currently **Associate Editor** of the **Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science**, Sage
- ⊖ He is **member of the Editorial Board** of **Energies**, MDPI.

Internationalisation

- ⊖ Since 2002 he is member of the **ASME (American Society of Mechanical Engineers)** and he was deputy Chair (2002-14), Chair (2014-15), and past Chair (2015-17), of the **ASME Italy Section**, while he is currently **INCOSE (International Council of Systems Engineers)**, through the Italian Chapter (AISE - Ass. Italiana Ingegneria) and even of the **Italian Society for Stress Analysis (AIAS)**.
- ⊖ As an invited lecturer, he taught **Structural Mechatronics¹**, **Structural Micromechanics²** and **Rotor dynamics and control³** in some short courses and seminars, held at:
 - ⊖ Jet Propulsion Laboratory/California Institute of Technology (USA) (2018),
 - ⊖ University of Toronto (Canada; 2016),
 - ⊖ EPF Sceaux (France) (2010 and 2006);
 - ⊖ Institute 'Marie Curie', Paris (France) (2010);
 - ⊖ Technische Universiteit Muenchen (Germany) (2006);
 - ⊖ "First European School on Mechatronics and Microsystems" Universiteit Carolo-Wilhelmina, Braunschweig (Germany) (2006);
 - ⊖ Université Blaise Pascal, Clermont Ferrand (France) (2005);
 - ⊖ "Microsystem Mechanical Design" CISM - Int. Center of Mechanical Sciences (Italy) (2004);
 - ⊖ Technical University of Helsinki, Otaniemi (Finland) (2002);
 - ⊖ Technical University of Delft (The Netherlands) (2001)
- ⊖ In 2019, he was instructor of the training course **'Application of the Model Based Systems Engineering to the product development and introduction to its tools and language'** at the Siemens Corporate Technology, Erlangen, Nuremberg (D).
- ⊖ He is **Campus leader**, at the Politecnico di Torino for the relations with the **Thomas and Stacey Siebel Foundation / Energy Institute**. Particularly, he is involved in the **Siebel Scholar** initiative, in which the Politecnico di Torino operates in collaboration with several other Universities as Berkeley, Carnegie Mellon, Illinois at Urbana-Champaign, MIT, Princeton, Ecole Polytechnique-Paris Saclay, Tsinghua (China) and University of Tokyo.
- ⊖ He is **member of the Scientific Council of the ESCP – European Business School** based in Paris, Berlin, London, Madrid, Warsaw and Turin (www.escp.eu).



- ☞ He is member of the Scientific Council of the EPF – Ecole d'Ingénieur-e-s, Sceaux-Troyes-Montpellier (France) (www.epf.fr).
- ☞ He is Chair of the institutional-flag and international conference “Nanoscience in Cancer Immunotherapy” , of the University of Torino and Politecnico di Torino, 2020, as a delegate of the Rector of the Politecnico di Torino role (www.cancerto.it)
- ☞ He is ad joint member of the national Committee for the celebration of 700 years after the death of Dante Alighieri (promoted by the Ministry of cultural goods and activity and of tourism), within the frame of the local committee in Turin (partnership among Universities, City of Turin, Regional Governance, National Library, in Turin).
- ☞ He is currently involved as a member of the Thematic Group of the EUA (European University Association) – CDS (Doctorate Council) for the Co-tutelles agreements.
- ☞ He is currently WP-co-leader in the UNITE! Alliance project funded by the ERASMUS+ Program for the development of a European Alliance, being the WP focused on the Doctorate (Alliance: TU Darmstadt, KTH Stockholm, University Helsinki, University of Lisboa, GPA Grenoble, Universidad Polytechnica de Catalunya UPC Politecnico di Torino).

Technology transfer and projects

- ☞ Since the research activity is strongly focused on the collaboration with industry, he contributed to several projects and he has been responsible for some partnerships between academia and industry, as between University of Torino & Cap Gemini/Ernst and Young (2002-2006), University of Udine & Danieli (2006-2008), and Politecnico di Torino & Danieli (2010-2015). He is active within the partnership between Politecnico di Torino and SKF (I).
- ☞ He has been even active in several work packages within some international and industrial projects in collaboration, for instance, with ESA (European Space Agency), U3P, Milliken Ltd (USA), IBM (UK), Airbus CRF (I), Leonardo Company (former Alenia) (I), and FBK (I).