



**Politecnico  
di Torino**

Dipartimento di Ingegneria Meccanica e Aerospaziale

Prof. Eugenio BRUSA



## Bio-sketch

Eugenio Brusa was born in Torino (Italy), in 1969.

### Studies

- He graduated as an *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, with a thesis on the design of an active stabilization of multibody rotor system, within 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 was co-founder of the *Interdepartmental Laboratory of Mechatronics* (1993).
- Since 2001 to 2008, he was with the University of Udine (Italy), at the Dept. of Electrical, Management and 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 *"Tech-Up" 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 the Dept. of Mechanical and Aerospace Engineering of the Politecnico di Torino. In 2010, he was appointed *Full Professor of Machine Design*, running in this role in 2013, as soon as the turnover allowed, and 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),
  - *Model-Based Systems Engineering applied to the sustainable and circular design of the Industrial Product* (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).
- Since 2023, member of the Scientific Board of the *Master in "Metallurgy 4.0: process management, technologies and sustainable innovation"*, Politecnico di Torino.

### Institutional roles

- 2015 – 2018: he was *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 has been *Director of the Doctorate School of the Politecnico di Torino*
- 2021 – 2024: he has been confirmed for a new mandate and is currently *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, industrial equipment; design of space structures as solar sails (Aurora Sail) and satellites (Galileo Galilei); design, dynamics and control of equipment for steelmaking as cold and hot rolling mills, electric arc furnaces, shredder hammers, flying cutters; numerical modelling via FEM and multibody dynamics.
  - **Structural mechatronics and micromechanics**: design of self-sensing piezoelectric transducers and structures, active magnetic bearings and suspension, active magnetic dampers; dynamics and control of motor vehicle; design of MEMs (Micro Electro Mechanical Systems) and RF-MEMs (Radio Frequency Micro 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 of the SysML and newer languages; early dysfunctional analysis of systems and integration with RAMS. Experimental validation. Industrial digitalization of Life Cycle Product development and integration with Additive Manufacturing. Integration of the MBSE and the “Circular Design”, to promote a smart reuse of parts, an effective recycling of materials, and the reduction of waste.
- He founded and currently leads a research group active within the **Industrial Systems Engineering and Design (ISED)**, applied to industry, smart manufacturing and products. This group operates in tight cooperation with the national and international companies specialized in this field, particularly within “smart manufacturing”, design of smart products and systems (mechanic, mechatronic and adaptive). This group manage the activity of some laboratories within the Politecnico di Torino, namely the “**Industrial and Smart Bearings testing**”, “**Gears testing**”, “**Fatigue testing**”, “**Energy harvesting by smart materials**” e collaborates together with other research groups, to the activity of the Laboratory “**Spinning test of rotating systems**”.

### Scientific production

- He wrote more than **260 papers**, either published on scientific journals or presented to international conferences.
- He is co-author of some **books** as *Microsystem Mechanical Design* (Springer, 2006), *MEMS: Technology, Fabrication Processes and Applications* (Nova Science, 2010) and even editor of *Mechatronics: Principles, Technologies and Applications* (Nova Science, 2015).
- He recently wrote two **textbooks**, one on structural mechatronics, being entitled *Meccatronica Strutturale: Sistemi e Tecnologia* (CET, 2016), in Italian, and one on the *Systems Engineering and Its Application to Industrial Product Development* (Springer, 2018).

### Internationalisation

- Since 2002 he has been member of the **ASME (American Society of Mechanical Engineers)**, being deputy Chair (2010-14), Chair (2014-15), and past Chair (2015-17), of the **ASME Italy Section**.
- He is currently member of the **INCOSE (International Council of Systems Engineers)**, through the Italian Chapter (AISE – Ass. Italiana Systems Engineering), and delegate of the Politecnico di Torino to that council.
- He is member of the **Italian Society for Stress Analysis (AIAS)**.
- As an invited lecturer, he taught **Structural Mechatronics<sup>1</sup>**, **Structural Micromechanics<sup>2</sup>** and **Rotor dynamics and control<sup>3</sup>** in some short courses and seminars, held at:
  - Jet Propulsion Laboratory/Caltech (<sup>1</sup> USA; 2018),
  - University of Toronto (<sup>1</sup> Canada; 2016),
  - EPF Sceaux (France; <sup>3</sup> 2010 and <sup>1</sup> 2006);
  - Institute ‘Marie Curie’, Paris (France; <sup>2</sup> 2010);
  - Technische Universiteit Muenchen (Germany; <sup>2</sup> 2006);



- “First European School on Mechatronics and Microsystems”, Universiteit Carolo-Wilhelmina, Braunschweig (Germany; <sup>2</sup> 2006);
- Université Blaise Pascal, Clermont Ferrand (France; <sup>1</sup> 2005);
- “Microsystem Mechanical Design” CISM – Int. Center of Mechanical Sciences (Udine, Italy; <sup>2</sup> 2004);
- Technical University of Helsinki, Otaniemi (Finland; <sup>3</sup> 2002);
- Technical University of Delft (The Netherlands) (<sup>3</sup> 2001).
- In 2019, he was instructor of the training course *‘Practical 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](http://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](http://www.epf.fr)).
- He has been recently *Chair of the institutional-flag and international conference “Nanoscience in Cancer Immunotherapy”*, of the University of Torino and Politecnico di Torino, 2021 ([www.cancerto.it](http://www.cancerto.it))
- He has been recently involved as a member in the *Peer Thematic Group of the EUA (European University Association) – CDS (Doctorate Council)* for the Co-tutelles agreements.
- He is currently *WP 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, Aalto University Helsinki, University of Lisboa, GPA Grenoble, Universidad Polytecnica de Catalunya UPC Barcelona, Graz Technical University, Wroclaw University of Science and Technology, Politecnico di Torino), for the two projects: I issue 2019-2021; II second step: 2022-2025.

#### 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 Udine & Cap Gemini/Ernst and Young* (2002-2006), *University of Udine & Danieli* (2006-2008), and *Politecnico di Torino & Danieli* (2010-2015; 2021-now). He is active within the partnership between *Politecnico di Torino and SKF* (I), *Politecnico di Torino and FCA-CRF/Stellantis* (F,I) and *Politecnico di Torino and Leonardo Company* (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 (D), FCA-CRF (I), Leonardo Company (former Alenia) (I), and FBK (I).

#### Roles at the Politecnico di Torino

- Delegate of the Rector of the Politecnico di Torino to the Conference of Rectors of the Italian Universities (CRUI) – Committee Research – Coordination of the Doctoral Education
- Committee for the strategies of the doctoral education, coordinator
- Committee for the research activity, technological transfer, services to the territory (CARTT), member
- Committee for the valorisation of Library, Archive and Museum Heritage, member
- Steering Committee for the implementation of The European Charter & Code for Researchers, member
- Organizing Committee of the annual event “Just the woman I am”, member
- Board of the Department of Mechanical and Aerospace Engineering.
- Rector’s Delegate to the CRUI – Board of Rectors of the Italian Universities – Committee Research – Working Group on the Doctoral Education.
- Board of the “China Center” of the Politecnico di Torino, invited member.