

Bruno Zappa  
Curriculum Vitae

## Education

- **Degree in Mechanical Engineering** obtained in 1991 at Politecnico di Milano with a final grade of 93/100.
- From **October 1991 to June 1992**, teacher of Mechanics, Electrical Engineering, and Systems at ITIS "E. Mattei" in Sondrio.
- From **November 1993 to November 1996**, **PhD in Applied Mechanics** (VIII cycle) at Politecnico di Milano; degree awarded on November 5, 1996, after defending the dissertation titled: "*Direct and Inverse Dynamics of Multibody Systems with Particular Focus on Human Movement.*"

## Professional Experience

- In **November 1996**, began working at the **Department of Mechanical Engineering, University of Brescia**, as a technical collaborator.
- From **November 1999 to October 2022**, **Researcher in Applied Mechanics** at the **School of Engineering, University of Bergamo**, Department of Engineering and Applied Sciences.
- Since **November 2002**, **Associate Professor of Applied Mechanics (ING-IND/13)** at the **Department of Engineering and Applied Sciences, University of Bergamo**.

## Teaching Activities

Teaching activities at the **University of Bergamo** began in **1999** and cover topics related to **Applied Mechanics in Machines**. Courses taught include:

- Functional Mechanical Design
- Fundamentals of Theoretical and Applied Mechanics
- Machine Dynamics
- Theory of Mechanisms
- Functional Machine Design

## Current Courses (University of Bergamo, School of Engineering):

- **"Robotics Mechanics"** (6 CFU)
- **"Power Drive Systems for Mechanical Machinery and Vehicles"** (6 ECTS) – for the Master's degree in *Mechatronics and Smart Technology*
- **"Theoretical and Applied Mechanics"** (6 CFU) – for the Bachelor's degree in *Engineering of Health Technologies*

## Other Teaching Experiences

- **1995/96 Academic Year**: Conducted exercises for "*Modeling and Simulation of Mechanical Systems*" (Biomedical Engineering Diploma, Politecnico di Milano, Segrate branch).
- **1995/96**: Assisted in exercises for "*Functional Mechanical Design*" and "*Machine Design*" (Mechanical Engineering, University of Brescia).
- **April 1996**: Held a seminar titled "*Simulation of Sports Exercises*" as part of the course "*Human Movement Dynamics*" (organized by CISM, Udine).

- **2003-2008:** Taught "*Mechanical Regulations*" at SILSIS (Lombardy Interuniversity School for Secondary Teaching), Bergamo-Brescia section.
- **2010:** Lecturer for the module "*Multi-Degree-of-Freedom Mechanical Systems and Control Strategies*" in the advanced training course "*Innovation Management for Product and Process Development*" (organized with Kilometro Rosso Science Park and Adecco).

### Additional Roles

- **2004-2012:** Member of the PhD Faculty in *Applied Mechanics* (administratively based at the University of Brescia).
- Organizing committee member for the **9th International Workshop on Research and Education in Mechatronics** (Bergamo, September 18-19, 2008).
- **2014-2015:** Member of the **Board of the Department of Engineering and Applied Sciences**.
- **Co-author** of lecture notes: "*Numerical Methods for the Study of Multibody Systems*" (specialization course "*From Drawing to Finite Element Modeling of Structural Components*").
- **2017-2019:** Participated in the **INPROVES** project (funded by Regione Lombardia under the "*Linea Accordi per la Ricerca e l'Innovazione*" call).
- **2006-2020:** Member of the "**Services for Disabled Students and Students with Learning Disabilities**" committee (representative for Engineering departments).
- **2020-Present:** Member of the "**Study Plans,**" "**Admissions,**" and "**Student Procedures**" committees for the Mechanical Engineering program.
- Since **2024**, he has been responsible for the Study Plans of the Bachelor's and Master's degree programs in "*Mechanical Engineering*", and of the Master's program in "*Mechatronics and Smart Technology Engineering*"

### Research Activity

Research has focused on:

- **Sports and Rehabilitation Biomechanics:** Study of devices for *in vivo*, non-invasive measurement of joint movements, vestibular system dynamics, and mechanical characterization of sports equipment.
- **Mechanical System Kinematics and Dynamics:** Applications in robotics and mechatronics, including:
  - **Free-flying space manipulators** (movement planning requiring dynamic approaches).
  - Development of **matrix methods** for kinematic/dynamic analysis of spatial systems (applied in robotics and biomechanics).
  - Synthesis and validation of **meso/mini manipulators** (serial/parallel kinematics for micro-manipulation and assembly).
- **Functional Mechanism Design:**
  - Optimization of "**flying cutting**" systems.
  - **Cam mechanism synthesis**.
  - Study of **balancing systems** for motion regularization in periodic machines.

Dalmine, 12/12/2025

Prof Bruno Zappa