

# CURRICULUM VITAE

## ANDREA AVANZINI

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Andrea Avanzini is **Associate Professor in Machine Design** at the Department of Mechanical and Industrial Engineering (DIMI) of the University of Brescia.

The main scientific interests of Andrea Avanzini concern the use of experimental and numerical methods for the analysis of the state of stress and deformation in structural components for industrial applications or in the biomechanical field, with particular reference to the use of advanced materials for lightweight structures and fatigue and structural integrity of metals, polymers and composites fabricated via additive manufacturing technologies.

Andrea Avanzini carries out teaching activities lecturing courses for the master's degrees of the CCSA of Industrial Engineering and has obtained the italian "Abilitazione Scientifica Nazionale" to Associate Professor in Machine Design on 10 apr 2017

- 2020-....** Associate Professor at the Department of Mechanical and Industrial Engineering (DIMI) of the University of Brescia. (SSD: ING-IND/14).
- 2005-2020** Researcher at the Department of Mechanical and Industrial Engineering (DIMI) of the University of Brescia. (SSD: ING-IND/14).
- 2003-2004** Research Fellow at University of Brescia ("Structural behavior of mechanical components in elastomeric material")
- 2001-2003** Product Engineer at Design Center TRW, Gardone V.T. (BS)
- 1998-2000** Research and Development Engineer at CRS Lucchini (Centro Ricerche e Sviluppo), Lovere (BG).
- 1997** Master Degree in Mechanical Engineering, University of Brescia.

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- **Researchgate Profile:**  
[https://www.researchgate.net/profile/A\\_Avanzini](https://www.researchgate.net/profile/A_Avanzini)

## **A) SCIENTIFIC ACTIVITY**

### **A1) Publications**

Andrea Avanzini is the author of 53 scientific articles published (or accepted for publication) in national and international journals and conference proceedings. (<https://iris.unibs.it/cris/rp/rp01366>)

(H-Index SCOPUS: 10, N ° SCOPUS citations: 282, N ° SCOPUS indexed publications: 32).

### **A2) Research areas**

The main research topics concern:

- Fatigue resistance of materials produced by Additive Manufacturing
- Advanced materials for lightweight structures
- Damage under cyclic loads and / or operating conditions in engineering materials
- Mechanical behavior of biomaterials and biological tissues
- Development of models of biomedical devices and surgical procedures for applications in the field of biomechanical research.

### **A3) Research projects in collaboration with national and international research groups**

- Collaboration for scientific research activities with Department of Mechanical and Industrial Engineering, Faculty of Engineering, NTNU (Norges teknisk-naturvitenskapelige universitet) in the field of fatigue and structural integrity of components produced through Additive Manufacturing (2019 to present)
- Participation in the departmental project (2016-2018) "ORING (Optimization, in Intense Radiation of Neutrons, of Seals) - Limits of use of polymer seals subjected to damage caused by intense fast neutron fields". Research project of the Department of Mechanical and Industrial Engineering of the University of Brescia with internal funding awarded on a competitive basis, in collaboration with: INFN National Laboratories of Legnaro, Applied Nuclear Energy Laboratory, LENA (University of Pavia), Fundamental and Applied Nuclear Physics Group (University of Brescia), Materials Science and Technology Group (University of Brescia)

- Departmental Research Project Manager (from 01-10-2011 to 01-10-2013) "Bio @ BeSt - Experimental characterization of the mechanical behavior of biological tissues and materials for biomedical applications". Research project of the Department of Mechanical and Industrial Engineering of the University of Brescia with internal funding assigned on a competitive basis. The research activity, carried out as coordinator of a multidisciplinary work unit, consisted in the design and construction of a biaxial test bench for tests on biological fabrics and / or biomaterials with low stiffness.
- Responsible of research fellowship University of Brescia, DIMI, (01-09-2010 to 31-08-2011): "Development of finite element models of heart valves". The research activity consisted in the development of structural FEM models with fluid interaction of the heart valve structure, also in collaboration with the Campinas Information Technology Center (CTI) of Campinas (SP - Brazil)
- Participation in research activities (2009-2015) in collaboration with Spedali Civili Hospital of Brescia (Cardiac Surgery Divisions) on issues related to the development of numerical models for the structural analysis of the effects of surgery on the mitral valve and biomechanical tests on aneurysmal aortic wall.
- Participation in research activities (2013-2014) on the mechanics of biological tissues in collaboration with Departamento de Ingeniería Mecánica, Tecnológico de Monterrey, (Mexico) and Group of Technologies and Processing systems of the University of Brescia as part of the IREBID project (FP7-PEOPLE-2009 Seventh Framework Program)
- Participation in Research Project of National Interest PRIN 2007 - "Analysis and monitoring of damage in polymer matrix composite materials (AMDACOMP)" as member of the research unit of the University of Brescia for the topic: "Analysis of damage by fatigue and cyclic contact of composites with PEEK matrix reinforced with microfibres ". The project was carried out in collaboration with the University of Parma, the Polytechnic of Milan, the University of Trieste, the University of Cagliari

#### **A4) Research and scientific consultancy with industrial partners**

- Participation in research and / or seminar activities commissioned by companies of national and international significance, operating in various industrial sectors including Evalve Inc. (CA, USA), Sidel SpA, SIG-Simonazzi Research Center, ATP SpA, Medtronic (main

topics: structural analysis of biomedical devices, polymer seals for very high pressures, fatigue damage due to cyclic contact).

#### **A5) Editorial/Referee activity**

- Member of the Editorial Board of the journal "Mathematical Problems in Engineering" (wos/scopus indexed)
- Guest Editor Special Issue "Fatigue in Materials Produced by Additive Manufacturing" on Materials, 2022

([https://www.mdpi.com/journal/materials/special\\_issues/Fatigue\\_MaterialsbyAM](https://www.mdpi.com/journal/materials/special_issues/Fatigue_MaterialsbyAM))

- Peer reviewer for several international journals  
(Journal of the Mechanical Behavior of Biomedical Materials, International Journal of Fatigue, International Journal of Mechanical Sciences, Materials & Design, Composites Part B, Composite Structures, Medical Engineering & Physics Journal of Biomechanics, International Journal for Numerical Methods in Biomedical Engineering, Medical & Biological Engineering & Computing, Cardiovascular Engineering and Technology, Experimental Techniques, International Journal of Experimental and Computational Biomechanics, Recent Patents on Mechanical Engineering...)
- Registered REPRISE (Register of Expert Peer Reviewers for Italian Scientific Evaluation) MIUR. Reviewer of research projects for national and international research agencies and PhD thesis.

### **B) ACADEMIC ACTIVITY**

#### **B1) Teaching**

- Associate Professor at the CCSA of Industrial Engineering lecturing master's degree courses:
- **STRUCTURAL DESIGN WITH INNOVATIVE MATERIALS**, 6 CFU (da A.A.2018/19 - ...)
- **STRUCTURAL BIOMECHANICS**, 3 CFU (da A.A. 2012/2013 - ...)
- **LABORATORY OF EXPERIMENTAL METHODS FOR STRUCTURAL DESIGN**, 3 CFU, (da A.A. 2019/2020 - ....)
- **DESIGN WITH ADVANCED MATERIALS**, 6 CFU (da A.A. 2011/12 a A.A. 2017/18)
- **DESIGN WITH COMPOSITE MATERIALS**, 6 CFU (da 2005 a A.A. 2010/11)

- **LABORATORY OF EXPERIMENTAL ANALYSIS OF STRESS AND NON-DESTRUCTIVE CONTROL TECHNIQUES**, 5CFU (da A.A. 2008/09 a A.A. 2009/10)

- Member Academic Board of Doctorate schools of Università degli Studi di BRESCIA from 2011 to 2020: (Applied Mechanics Cycles: XXVII, XXVIII, Mechanical and Industrial Engineering Cycle: XXIX, TECHNOLOGY FOR HEALTH (cycles from 2014/15 to 2019/20)
- Supervisor or co-supervisor of approximately 40 Bachelor's and Master's / Master's degree thesis in Mechanical Engineering; tutor of internal / external Curricular Projects.
- Thesis supervisor in the context of international student mobility programs in collaboration with foreign universities (Eg Otto-Von-Guericke-Universitat, Magdeburg, Germany, DTU-Technical University of Denmark, UPMC Paris France, NTNU Norges teknisk -naturvitenskapelige universitet, Trondheim, Norway, Ghent University, Belgium)
- Lecturer for the workshop "Mechanical testing of Living Tissue", International Summer School "The Biomedical manufacturing Summer School" promoted within the IREBID Project (Marie Curie project (FP7-PEOPLE-2009-IRSES-247476)
- Supervisor Doctorate Thesis in Applied Mechanics, Cycle XXVII, University of Brescia ("Structural analysis of biological tissues for cardiac surgery applications: computational and experimental approaches")

### **B1) Institutional**

- Member of Departmental and CCSA commissions for Culture and Research, Teaching Laboratory funds, Research quality, International teaching programmes
- Aggregate member of the public Examination Commission for qualification to the profession of Engineer (2008, 2018,2021)

### **C) PROFESSIONAL EXPERIENCES**

- **R&D Engineer - Lucchini C.R.S. Centro Ricerche e Sviluppo, Lovere (BG)** (from 01/1998 to 01/2001). Applied research activity, carried out in the context of projects admitted to public financing or with main national and international railway manufacturers, also in collaboration with the University of Brescia and the Polytechnic of Milan, aimed at the design of innovative rolling stock (e.g. wheels, steel monobloc brake

discs) and the development of full-scale test methods on rolling stock (e.g. railway axles) for the evaluation of fatigue resistance.

- **2001-2003 - Product Engineer TRW Automotive Inc. – Chassis Systems, Gardone V.T. (BS)** (from 02 / 2001-01 / 2003). Steering gear box design and EPS (Electrically Powered Steering) product configuration management at TRW Design Center, automotive sector,

**Brescia, 13/01/2022**

**Andrea Avanzini**