

ESB Early Career Researcher Award: CV (2 pages) and letter (1 page)

PERSONAL INFORMATION

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NARRATIVE RESUME

I received my **PhD** in Civil, Environmental and Mechanical Engineering at the University of Trento – UniTN (IT) in **June 2018**. Then, after two years of postdoctoral fellowships (one year funded by CARITRO – Cassa di Risparmio Trento e Rovereto), I moved to the University of Padova - UniPD (IT) as assistant professor in industrial bioengineering (Dep. of Civil, Environmental and Architectural Engineering, DICEA).

I had the opportunity to hold the role of **Principal Investigator** of the multidisciplinary project “Computational gastric biomechanics to improve bariatric surgery procedures with a patient-specific approach” funded by DICEA-UniPD (BIRD 2022), as well as to be involved in national (PRIN 2022, MIUR-FISR) and international (FF4EuroHPC H2020) projects. I have been the **supervisor of a postdoc researcher** (Dec 2022-Oct 2023) and a **research fellow** (Nov 2023-Jan 2024) and I am the **co-supervisor of three PhD students**. From June 2022 I have been the **supervisor** of both **Master** (13) and **Bachelor** (25) graduating **students**.

In 2023, my research received **two awards** : **(i)** British Journal of Surgery Oral Abstract Prize at Fourth IBC Oxford University World Congress 2023 for the oral contribution “Dynamic magnetic resonance imaging (Dy-MRI) evaluation of the impact of endoscopic sleeve gastroplasty (ESG) on gastric structure and function in morbid obese patients” and **(ii)** “Advancements in In Silico Modeling for Medical Device Performance Assessment” Award at the XII Annual Meeting ESB-ITA2023 sponsored by Dipro Medical Devices Srl for the poster contribution “Biomechanical characterization of the human fasciae of the abdominal region. I am going to spend **one month at the University of Reykjavik** (May 2024) as visiting professor.

TEACHING ACTIVITIES

2022– 2023 Lecturer - PhD course “Theoretical and experimental non-linear solid mechanics for biomedical materials”, PhD School in Sciences of Civil, Environmental and Architectural Engineering (UniPD, IT).

2022 – now Lecturer – “Biomechanics” Dep. of Information Engineering, UniPD, IT

2022 – now Lecturer – Summer Course “Biomechanics”, Bressanone (BZ), UniPD, IT

2021 – 2023 Lecturer – “Biomechanics” Dep. of Biomedical Sciences, UniPD, IT

2015 – 2021 Teaching Assistant – “Structural Mechanics” Dep. of Civil Environmental and Mechanical Engineering, UniTN, IT.

ORGANISATION OF SCIENTIFIC MEETINGS

2023 Member of the Organizing Committee of the VIII Congress of the National Group of Bioengineering (GNB) (<http://gnb2023.it>), Padova in 2023, 21-23 June.

2022 – 2023 Invited speaker at both the Winter Schools on Fascial Anatomy, UniPD, Feb. 13th-17th, 2023 and Feb 7th-11th, 2022 (Scientific Director: Prof. Carla Stecco).

2022 Chair and speaker in the workshop organized by CECOMES “Il ruolo delle metodiche ingegneristiche e della medicina “in silico” nella progettazione e certificazione di dispositivi e procedure clinico-chirurgiche”, June, 15th, 2022

INSTITUTIONAL RESPONSIBILITIES

2023 Member of the evaluation Committee for “Shaping a World-Class University” Award, UniPD, 2023, second call.

2023 - 2024 Member of the evaluation Committee for the CECOMES AWARD (promoted by the MIUR-FISR project CECOMES).

2022 – 2024 Member of the Degree Course of Biomedical Engineering, DEI, UniPD, IT

2021 – 2023 Member of the Degree Course of Sport Sciences, DSB, UniPD, IT

2021 – 2023 Member of selections Committee for academic fellowships; DICEA, UniPD, Italy

REVIEWING ACTIVITIES

2021 External Reviewer for ERC Starting Grant 2021 Call - panel PE8;

2021 – 2022 Guest Editor for the Special Issue " Mechanics of biological materials and biomaterials", ongoing, published in Processes (MDPI)

2023 – now Guest Editor for the Special Issue "Biomechanics of Soft and Hard Tissues", published in Applied Sciences (MDPI)

2022 – Review Editor in Biomechanics (Frontiers in Bioengineering and Biotechnology)

2019 – now Reviewer for several scientific Journals such as Acta Biomaterialia, Helion, Frontiers in Endocrinology, J. of the Royal Society Interface, Scientific Reports, etc.

MEMBERSHIPS OF SCIENTIFIC SOCIETIES

2022 – now Member of the “European Society of Biomechanics” (ESB)

2021 – now Member of the “Italian National Group of Bioengineering” (GNB)

MAJOR COLLABORATIONS

Prof. Nicola M. Pugno, Solid Mechanics of bioinspired materials, UniTN, Italy

Prof. Alvaro Mata, Biomedical Engineering and Biomaterials, University of Nottingham, UK

Prof. Michel Gagner, Bariatric Surgery, Hôpital du Sacré-Coeur de Montréal, Canada

Prof. Silvana Perretta, Bariatric Surgery, IHU Strasbourg, IRCAD France, France

Prof. Paolo Gargiulo, synthetic substitute for biological tissues, 3D printing and manufacturing, University of Reykjavik, Island.

YOUR THREE MOST RELEVANT PAPERS

1. Berardo and N. M. Pugno. A model for hierarchical anisotropic friction, adhesion and wear. *TRIBOLOGY INTERNATIONAL* (2020), 152, 106549.
2. A. Berardo, G. Costagliola, S. Ghio, M. Boscardin, F. Bosia, N. Pugno, An experimental-numerical study of the adhesive static and dynamic friction of micro-patterned soft polymer surfaces. *MATERIALS&DESIGN* (2019), 181, 107930.
3. I. Toniolo, P. Pirini, S. Perretta, E. L. Carniel, A. Berardo. Endoscopic versus laparoscopic bariatric procedures: a computational biomechanical study through a patient-specific approach, *COMPUTER METHODS AND PROGRAMS IN BIOMEDICINE* (2024), 243, 107889.

ESB Early Career Researcher Award

Dear Committee Members,

I am writing to express my candidacy for the ESB Early Career Researcher Award, an esteemed international recognition that would mark a significant milestone in my career as a young researcher. This acknowledgment would serve as an honour and an official validation of the personal and professional results I have diligently pursued.

Throughout my academic journey, I have had the privilege of collaborating with diverse co-authors and engaging in robust **multidisciplinary endeavours**, thereby expanding my network and expertise.

In the last years, I approached new topics, including computational studies on bariatric surgery using patient-specific 3D models derived from Magnetic Resonance Imaging (MRI). This endeavour culminated in the receipt of the British Journal of Surgery Oral Abstract Prize. Additionally, I spearheaded activities related to the biomechanics of soft tissues in collaboration with the Departments of Neuroscience and Orthopaedics at UniPD. Moreover, my exploration into cartilage mechanics fostered a collaboration with the University of Reykjavik, where I am scheduled to partake in a month-long engagement this coming Spring, involving combined teaching and research initiatives.

Notably, my ongoing **research on breast tissue biomechanics** aims to conceptualize and develop a novel **biomimetic breast implant for tissue regeneration**, integrating biomechanics, tissue engineering, and metamaterials. This interdisciplinary pursuit encompasses experimental and computational biomechanics with 3D printing to achieve several objectives: (i) provide a quantitative biomechanical characterization of breast tissues, (ii) identify and develop a biocompatible metamaterial scaffold for breast tissue regeneration, (iii) optimize a biomimetic breast implant, and (iv) create patient-specific in-silico models to validate the mechanical interaction between the implant and the breast.

I hold unwavering confidence in the potential of this research and am enthusiastic about the prospect of receiving support from the ESB Early Career Researcher Award. Such recognition would afford me the opportunity to submit abstracts and **attend esteemed international conferences** like the World Congress of Biomechanics (WCB) in 2026. Furthermore, this award would alleviate the significant costs associated with conference participation and would enrich my professional journey, facilitating my growth as an independent researcher.

Thank you for considering my application. I eagerly anticipate the opportunity to contribute to the advancement of biomechanics and tissue engineering, guided by the support of the ESB Early Career Researcher Award.

Sincerely,

Padova, 30/01/2024

Alice Berardo

