

Name and Surname: Gregorio Pisaneschi

Key Publication: [Composites Part B - Enhanced Adhesion in SMA Composites via Elastomeric Interface - DOI](#) ↗

Key Project: [How to make a difference in people's lives, one simple gesture at a time - YouTube](#) ↗

## RESEARCH, WORK EXPERIENCE & PROJECTS

Feb. 2024 – Onward	<b>Research Grant</b> - University of Bologna, DIN & CIRI MAM departments Feb. 2024 – Jan 2025, CIRI-MAM, project DAREDEVIL (PR-FESR 2021-27, coordinator Bi-Rex) <ul style="list-style-type: none"><li>Digital Twins A supporto dei DEVOps in ambienti Industriali <a href="#">DAREDEVIL</a> ↗.</li></ul> Aug. 2025 – Onward, DIN, project ReMovAble, Tutor: Prof. Nicola Sancisi <ul style="list-style-type: none"><li>Research and development of a biomedical device for assistance with hand movements [3].</li></ul>	
Oct. 2020 – June 2024	<b>Ph.D. - Mechanics And Advanced Engineering Sciences (DIMSAI)</b> University of Bologna, Industrial Engineering Department (DIN) Supervisor: Prof. Andrea Zucchelli   Title: Study and Design of Novel Applications and Implementation Strategies for <b>Shape Memory Alloys (SMAs)</b> [1]   Topics: <ol style="list-style-type: none"><li><b>How it works:</b> thermo-mechanical characterisation &amp; modelling of SMA</li><li><b>Design &amp; Fabrication:</b> novel methods &amp; innovative applications<ul style="list-style-type: none"><li>Embedded SMA wires in composites [2] &amp; in 3D-printed artefact</li><li>SMAs applied to soft robotic assistive devices for tetraplegic people [3]</li></ul></li><li><b>Knowledge &amp; Tech. Transfer:</b> involving students, institutes &amp; companies.</li></ol> <b>Visiting</b> - Biomedical Neuroengineering Group, Miguel Hernandez University <ul style="list-style-type: none"><li>Feasibility study of a SMA Bowden cable for assistive devices.</li></ul>	<i>Commission evaluation: Excellent</i>
June 2022 – Onward	<b>Arburg Plastic Freeformer project</b> [4] University of Bologna, CIRI MAM / BI-REX Competence Center <ul style="list-style-type: none"><li>Study of the droplet process, design for droplet 3D printing with custom materials [5]</li><li>Study and design of 3D printed maxillofacial implants [6]</li></ul>	
Sept. 2017 – Onward	<b>Adjunct Professor</b> University of Bologna, Department Of Electrical, Electronic, And Information Engineering "Guglielmo Marconi" (DEI), Course 37065 - Automatic Machines T (Module 2).	
Sept. 2015 – Nov. 2020	<b>Research Fellow</b> - University of Bologna, DIN & CIRI MAM departments Jan. 2020 – Nov. 2020, ACMEC European Project <a href="#">ACMEC.it</a> ↗ <ul style="list-style-type: none"><li>Design of an actuation system with Shape Memory Alloy actuators for format changes [7]</li></ul> Oct. 2017 – Dec. 2019, Company: IMA (Industria Macchine Automatiche) <ul style="list-style-type: none"><li>Design for 3D printing and Topology Optimization</li><li>Design and teaching of a course: "Additive Manufacturing: strategies and design methods."</li></ul> Nov. 2016 – June 2017, Company: PMI (Philip Morris International.) <ul style="list-style-type: none"><li>Investigation of process criticalities for the production of Iqos sticks</li></ul> Sept. 2015 – Oct. 2016, Company: Coop. Edile Appenini (CEA) <ul style="list-style-type: none"><li>Design of a winch carriage for dam waterproofing</li></ul>	

29/08/2025

## EDUCATION & TRAINING

Sep. 2012 – July 2015	<b>Master of Mechanical Engineering (Degree class LM-33)</b> <i>Alma Mater Studiorum - Università di Bologna - Faculty of Engineering</i> Specialisation: Mechanical engineering of the automation and the design	110/110 <i>with honour</i>
Oct. 2014 – Feb. 2015	<b>Master's theses abroad (University of Twente, Netherlands)</b> Supervisors: <i>Prof. M. Carricato, Prof. J. Herder, Prof. R. Vertechy</i>   Title: Design and Optimisation of a Large Stroke Flexure Hinge for Parallel Mechanisms <a href="#">Thesis presentation - Prezi</a> ↗	

## VOLUNTEERING

2019 - 2021	<b>Cook at popular kitchen: Cucine Popolari CIVIBO</b> <a href="https://www.cucinepopolari.org/">https://www.cucinepopolari.org/</a> ↗
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## PERSONAL SKILLS

<b>Mother tongue</b>	ITALIAN
<b>Other language</b>	ENGLISH - Professional working proficiency   SPANISH - Limited working proficiency
<b>Practical skills</b>	Basic mechanical operator skills: <i>mounting, unmounting, drilling, milling, etc.</i>   Rapid Prototyping   Universal testing machines (hydraulic, electromechanical): <i>tensile, shear, flexural, pull-out testing, etc.</i>   Drop weight impact test   Digital Image Correlation   3D printing: <i>FDM, APF, DLP.</i>
<b>Computer skills</b>	CAD 3D ( <i>Design, analysis, surfaces, topology optimisation, generative design, kinematic analysis</i> )   MATLAB ( <i>Modal analysis, Optimisation and non-linear problems solution, Data Analysis</i> )   Wolfram Mathematica ( <i>Linear and non-linear problem solving, Parametric Design</i> )   ANSYS ( <i>PRBM, Modal, Structural, Flexible, Transient, Topology optimisation</i> )
<b>Soft skills &amp; Interests</b>	Versatile in diverse research topics. Simplifying complex problems with innovative, efficient solutions. Developing strategies to divide and conquer challenges. Experience in Interdisciplinary Collaboration, Project Management, Public Engagement and Mentorship. Predisposition to self-management and self-improvement. Passionate about dissemination and sharing expertise from research to the culinary arts. Enthusiastic about mountain sports, techniques, and instrumentation.

## RESEARCH & TEACHING, OVERVIEW

<b>Research Statement</b>	<p><b>Current - Shape Memory Alloy, Composite, 3D printing, Medical Devices</b></p> <p>I'm dedicated to the study and application of Shape Memory Alloys (SMA) on various research projects such as SMA hybrid composites (SMAHC) for morphing applications [8], prototyping of SMA actuated devices [7], innovative self-sensing transmission systems for assistive devices.</p> <p>I'm also involved in 3D printing in several research projects such as the study, manufacturing and testing of medical implants [4, 6], the testing of custom material [4, 5] studies on sustainability and recycling [4] study of the process for additively manufactured electronics [9].</p> <p><b>Future - Soft Robotics, Assistive Devices</b></p> <p>My focus in the future will be to finalise the ReMovAble assistive hand exoskeleton, currently a volunteering project [3], to exploit my patent on the superelastic Bowden cable and the development of a soft-rigid hybrid solution for the exoskeleton.</p>
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## Teaching Statement

### Teaching Philosophy and Approach

I have been teaching for nine years at the bachelor course of Automatic Machines to Automation Engineers (class sizes from 100 to 150 students). My teaching philosophy revolves around engaging students actively and fostering a collaborative learning environment. I transitioned from classical tests and oral exams to group projects as final assignments to enhance student engagement. These projects included a final presentation in front of colleagues and a Q&A session. Projects involved studying automatic pneumatic systems: process analysis, functional diagrams, layout design, and component dimensioning ([Projects Exempli Gratia - Zenodo ↗](#)).

### Methods and Objectives

Employed a variety of approaches, such as interactive exercises and targeted questioning, to maximise student engagement and comprehension of theoretical concepts. To meet different levels of commitment, I offered different options: self-chosen projects or developing a prototype of their invention in a maker space [10]. The latter, developed by me with former students and colleagues' help, comprised workshops covering design thinking, rapid prototyping, open-source electronics, and innovative materials. These initiatives enhanced students' technical, creative, collaborative, and management skills, culminating in participation in the university start-up day.

### Evidence of Quality of Teaching

Equipped with the tools provided by the lessons and workshops, the students developed excellent projects (e.g. [Rubik's cube assembly - Prezi ↗](#)). Several projects participated in the start-up days and received significant recognition (e.g. [Sun F\(ol\)lower - Zenodo ↗](#)). Students' Testimonials highlight the teaching's impact: "This course provided us with valuable practical skills and experiences beyond traditional academic formulas and theorems, significantly enhancing our academic and professional journeys." [Homo Sapiens Faber: learning today - Article ↗](#)

## Supervision

For the past two years, I have mentored a younger researcher, P. Cosseddu, throughout his PhD on morphing structures and AMed electronics. I'm also collaborating with colleagues to supervise other researchers' work, leveraging my experience as a senior. For instance, I'm helping supervise two researchers' work at the Department of Medical and Surgical Sciences [6].

I have supervised numerous bachelor theses. Three prototypes of hand exoskeletons were successfully developed by coordinating a team of students from automation, design, mechanical, and management [3]. Additionally, I have supervised master thesis of industrial, research, and innovative projects, such as the national runner-up of the Dyson Award 2023 [Braille Fly ↗](#)

## Public Engagement & Administrative Duties experiences

I've participated in events by Arburg GmbH. Thanks to our research work with the Arburg Plastic Freeformer (APF), we have been the driving research group in the realisation of a national user group ([Arburg user Community - Article ↗](#), [Arburg+Unibo Seminar - Article ↗](#))

I've always been highly motivated to engage the public: a chapter of my PhD dissertation is dedicated to knowledge transfer, I participated in the university program for the realisation of a divulgation article ([Homo Sapiens Faber: learning today - Article ↗](#)) and a divulgation video ([How to make a difference in people's lives, one simple gesture at a time - YouTube ↗](#)).

I've also been very keen and proactive in the well-being and improvement of my research group. I've organized the shared database and communication, group meetings, team-building and helped with purchase orders. I'm managing a project to realise a hand-assistive exoskeleton [3] involving several research groups. I've organised a series of roundtables at the departmental level titled "A.I. powering research". I've organised seminars for my students with leading companies in the automation sector (Pneumax, Festo). I organised a webinar with a leading company in intelligent materials [1], with whom I negotiated an NDA (SAES Gatter). I prioritised the well-being and growth of individuals over institutional needs, supporting colleagues and co-workers.

## PUBLICATIONS &amp; PATENTS

## Publications

**Superelastic Tendon-Like Bowden Cables: Advancing Assistive Exoskeletons**

Authors: G. Pisaneschi et. al. | Year: 2025 | Impact: first work proposing Superelastic wires Bowden cables demonstrating increased efficiency and safety | Accepted (Aug. 2025) in *IEEE Robot. Autom. Lett.*

**Numerical and Experimental Exploration of Patient-Specific Cranial Implants with 3D Printed PEKK via Arburg Plastic Freeforming**

Authors: G. Pisaneschi | Year: 2025 | Journal: *Progress in Additive Manufacturing* | Impact: FEA and experiments on patient-specific cranial implants 3D printed with amorphous PEKK with APF technology demonstrated potential to overcome PEEK challenges | DOI:10.1007/s40964-025-01098-1 ↗

**Enhanced interface adhesion in shape memory alloy hybrid composites via an elastomeric interface: An experimental and numerical investigation**

Authors: G. Pisaneschi, T. Brugo, A. Zucchelli et. al. | Year: 2024 | Journal: *Composite Part B: Engineering* | Impact: first work in the literature to effectively address and solve the challenges of large strains during martensitic transformations in hybrid composites | DOI:10.1016/j.compositesb.2024.111785 ↗

**Numerical and experimental investigation of a 3D-printed PCU patient-specific cranial implant**

Authors: G. Pisaneschi, M. Mele, L. Cercenelli et. al. | Year: 2023 | Journal: *Progress in Additive Manufacturing* | Impact: feasibility of using Arburg Plastic Freeforming (APF) technology to fabricate patient-specific cranial implants from medical grade PCU | DOI:10.1007/s40964-023-00452-5 ↗

All Publications: [Gregorio Pisaneschi - Google Scholar](#) ↗

## Patents

**High-efficiency self-limiting tendon-mimetic Bowden cable with feedback control**

Inventor: G. Pisaneschi | Filed: 2024 | Protection: Italy | Description: transmission system for biomedical and prosthetic applications with a Bowden cable with a tendon-mimetic superelastic alloy wire | Advantages: highly efficient transmission, intrinsic overload control and soft behaviour, with no additional control. The superelastic wire can be used as a sensor for feedback control | [EXOSKELETON AND METHOD OF OPERATING AN EXOSKELETON](#) ↗

## ADDITIONAL INFORMATION

## References

- **Andrea Zucchelli**, Full Professor, DIN, University of Bologna, E-mail: [a.zucchelli@unibo.it](mailto:a.zucchelli@unibo.it)
- **Emanuela Marcelli**, Associate Professor, Department of Medical and Surgical Sciences, University of Bologna, E-mail: [emanuela.marcelli@unibo.it](mailto:emanuela.marcelli@unibo.it)
- **Nicola Sancisi**, Associate Professor, DIN, University of Bologna, E-mail: [nicola.sancisi@unibo.it](mailto:nicola.sancisi@unibo.it)

## Collaborations

- [1] SAES Group, shape memory alloy division – consulting and material furnished for research
- [2] Kraiburg, Kraibon elastomer division – consulting and material furnished for research
- [3] Montecatone Rehabilitation Institute – tetraplegic patients, Dr. L. Simoncini, Dr. S. Olivi
- [4] Arburg Italia (I. Panfiglio) and Arburg GmbH (D. Von Zeppelin) – Arburg Plastic Freeformer
- [5] RADICI GROUP – design and testing of PA6-specific formulations for APF 3D printing
- [6] S. Orsola-Malpighi Polyclinic – Prof. E. Marcelli, PhD L. Cercenelli, Dr. A. Tarsitano
- [7] Laboratory of Automation and Robotics (LAR) @UniBo – Prof. A. Tilli, PhD A. Bosso
- [8] Università di Padova – Giulia Scalet (expertise Shape Memory Alloy modelling)
- [9] Bi-Rex Competence Center – Nano Dimension Dragonfly Additive Manufactured electronics
- [10] [Almalabor – I.D.E.A. Innovation - Entrepreneurship - MakerSpace - Alma Mater \(unibo.it\)](#) ↗