

## Elenco delle pubblicazioni e della tesi di dottorato

1. **Luca D'Andrea**, *Design and Characterization of Bioceramic Scaffolds for Bone Tissue Engineering*, PhD Thesis in Materials Engineering at Politecnico di Milano.
2. Baino F., Gabrieli R., Verné E., Schiavi A., Schwentenwein M., **D'Andrea L.**, Vena P., *Optimizing the Design and Manufacturing of Bioceramic Scaffolds towards Bone-like Architectures*, *Ceramics International* (2025), 10.1016/j.ceramint.2025.02.307
3. **D'Andrea L.**, Gabrieli R., Milano L., Magagnin L., De Cet A., Alidoost D., Schwentenwein M., Verné E., Baino F., Vena P., *Elastic and failure characterization of hydroxyapatite TPMS scaffolds using a combined approach of ultrasound, compression tests and micro-CT based numerical models*, *Acta Materialia* (2025), 10.1016/j.actamat.2025.120776
4. **D'Andrea L.**, Yang T., Dao M., Vena P., *Nature-inspired orientation-dependent toughening mechanism for TPMS ceramic architectures*, *MRS Bulletin Impact* (2025), 10.1557/s43577-024-00831-5
5. Stratakos E., Tscheuschner L., Vincenzi L., Pedrinazzi E., Sigala F., **D'Andrea L.**, Gastaldi D., Berti F., Tzafriri R., Pennati G., *A novel in silico-ex vivo model for correlating coating transfer to tissue with local drug-coated balloon-vessel contact pressures*, *Annals of Biomedical Engineering* (2024), 10.1007/s10439-024-03634-6.
6. Ibrahim S., **D'Andrea L.**, Gastaldi D., Rivolta M. W., Vena P., *Machine Learning approaches for the design of biomechanically compatible bone tissue engineering scaffolds*, *Computer Methods in Applied Mechanics and Engineering* (2024), 10.1016/j.cma.2024.116842
7. De Cet A., **D'Andrea L.**, Gastaldi D., Baino F., Verné E., Örlýgsson G., Vena P., *Micro-CT imaging and finite element models reveal how sintering temperature affects the microstructure and strength of bioactive glass-derived scaffolds*, *Scientific Reports* (2024), 10.1038/s41598-023-50255-5
8. **D'Andrea L.**, Gastaldi D., Baino F., Verné E., Schwentenwein M., Örlýgsson G., Vena P., *Computational models for the simulation of the elastic and fracture properties of highly porous 3D-printed hydroxyapatite scaffolds*, *International Journal for Numerical Methods in Biomedical Engineering* (2023), 10.1002/cnm.3795
9. **D'Andrea L.**, Gastaldi D., Baino F., Verné E., Saccomano G., D'Amico L., Longo E., Schwentenwein M., Vena P., *Mechanical characterization of miniaturized 3D-printed hydroxyapatite parts obtained through vat photopolymerization: an experimental study*, *Journal of the Mechanical Behavior of Biomedical Materials* (2023), 10.1016/j.jmbbm.2023.105760
10. **D'Andrea L.**, De Cet A., Gastaldi D., Baino F., Verné E., Vena P., *Estimation of elastic modulus, fracture toughness and strength of 47.5B-derived bioactive glass-ceramics for bone scaffold application: a nanoindentation study*, *Materials Letters* (2023), 10.1016/j.matlet.2022.133783
11. **D'Andrea L.**, Cardamone M., Bogoni F., Forzinetti E., Enei V., Valle F., Gastaldi D., Vena P., *Anisotropic mechanical response of bovine pericardium membrane through bulge test and in-situ confocal-laser scanning*, *Journal of Biomechanical Engineering* (2023), 10.1115/1.4056398/6954160/bio-22-1178
12. **D'Andrea L.**, Gastaldi D., Baino F., Verné E., Massera J., Örlýgsson G., Vena P., *Mechanical Properties of Robocast Glass Scaffolds Assessed through Micro-CT-Based Finite Element Models*, *Materials* (2022), 10.3390/ma15186344
13. Arnoldi I., Mancini G., Fumagalli M., Gastaldi D., **D'Andrea L.**, Bandi C., Di Venere M., Iadarola P., Forneris F., Gabrieli P., *A salivary factor binds a cuticular protein and modulates biting by inducing morphological changes in the mosquito labrum*, *Current Biology* (2022), 10.1016/j.cub.2022.06.049

## Pubblicazioni

1. **Tuna M.**, Trovalusci P., Fantuzzi N. (2025) An energy-based fracture criterion for quasi-brittle crack propagation in micropolar continuum: Analytical and numerical study. *International Journal of Engineering Science*, 206, 104173.
2. **Tuna M.**, Trovalusci P., Fantuzzi N. (2025) On quasi-brittle fracture analysis of micropolar plates via XFEM model. *International Journal of Engineering Science*, 206, 104168.
3. Izadi R., **Tuna M.**, Trovalusci P., Fantuzzi N. (2023) Thermomechanical characteristics of green nanofibers made from polylactic acid: An insight into tensile behaviour via molecular dynamics simulation. *Mechanics of Materials*, 181, 104640.
4. **Tuna M.**, Trovalusci P. (2022) Topology optimization of scale-dependent non-local plates. *Structural and Multidisciplinary Optimization*, 65, 248.
5. **Tuna M.**, Trovalusci P. (2021) Stress distribution around an elliptic hole in a plate with ‘implicit’ and ‘explicit’ non-local models. *Composite Structures*, 256, 113003.
6. Izadi R., **Tuna M.**, Trovalusci P., Fantuzzi N. (2021) Bending characteristics of carbon nanotubes: Micropolar elasticity models and molecular dynamics simulations. *Mechanics of Advanced Materials and Structures*, 30:1, 189-206.
7. Izadi R., **Tuna M.**, Trovalusci P., Ghavanloo, E. (2021) Torsional characteristics of carbon nanotubes: Micropolar elasticity models and molecular dynamics simulation, *Nanomaterials*, 11:2, 453.
8. **Tuna M.**, Kirca M. (2021) Unification of Eringen’s nonlocal parameter through an optimization based approach. *Mechanics of Advanced Materials and Structures*, 28:8, 839-848.
9. **Tuna M.**, Leonetti L., Trovalusci P., Kirca M. (2020) ‘Explicit’ and ‘implicit’ non-local continuous descriptions for a plate with circular inclusion in tension. *Meccanica*, 55:4, 927-944.
10. **Tuna M.**, Trovalusci P. (2020) Scale dependent continuum approaches for discontinuous assemblies: ‘explicit’ and ‘implicit’ non-local models. *Mechanics Research Communication*, 103, 103461.
11. **Tuna M.**, Kirca M., Trovalusci P. (2019) Deformation of atomic models and their equivalent continuum counterparts using Eringen’s two-phase local/nonlocal model. *Mechanics Research Communication*, 97, 26-32.
12. **Tuna M.**, Kirca M. (2017) Bending, buckling and free vibration analysis of Euler-Bernoulli nanobeams using Eringen’s nonlocal integral model via finite element method. *Composite Structures*, 179, 269-284.
13. **Tuna M.**, Kirca M. (2017) Respond to the comment letter by Romano and Barretta on the paper “Exact solution of Eringen’s nonlocal integral model for bending of Euler–Bernoulli and Timoshenko beams”. *International Journal of Engineering Science*, 116, 141-144.
14. **Tuna M.**, Kirca M. (2016) Exact Solution of Eringen’s nonlocal integral model for vibration and buckling of Euler-Bernoulli beam. *International Journal of Engineering Science*, 107, 54-67.

15. **Tuna M.**, Kirca M. (2016) Exact Solution of Eringen's nonlocal integral model for bending of Euler-Bernoulli and Timoshenko beams. *International Journal of Engineering Science*, 105, 80-92.
16. **Tuna M.**, Sunbuloglu E., Bozdog E. (2014) Finite element simulation of the behavior of the periodontal ligament: a validated nonlinear contact model. *Journal of Biomechanics*, 47:12, 2883-2890.
17. **Tuna M.**, Ongaro G., Trovalusci P., Fantuzzi N. (2024) Computational Approaches for Crack Propagation in Materials and Structures: Comparison Between Linear Elastic Fracture Mechanics (LEFM) and Peridynamics (PD) Based Strategies. *Comprehensive Mechanics of Materials*, edited by Silberschmidt, 87-103, Elsevier.
18. **Tuna M.**, Leonetti L., Trovalusci P., Kirca M. (2021) 'Explicit' and 'implicit' Non-local Continuum Descriptions: Plate with Circular Hole. *Size-dependent Continuum Mechanics Approaches*, edited by Ghavanloo E., Fazelzadeh S.A., Marotti de Sciarra F., 311-338, Springer.

## 1. Education

2025-2025	Postgraduate Program (II Level Master) in Multifunctional Metamaterials and Metastructures at <i>Università di Trento</i> , Trento, Italy Expected end in 12/2025
2020-2024	PhD degree <i>cum Laude</i> in Materials Engineering at <i>Politecnico di Milano</i> , Milan, Italy
09/2020	License to practise as engineer (Industrial Engineering)
2017-2020	Master of Science: Biomedical Engineering at <i>Politecnico di Milano</i> , Milan, Italy Mark: 107/110
2013-2017	Bachelor of Science: Medical Engineering at <i>Università di Roma "Tor Vergata"</i> , Rome, Italy Mark: 99/110
2008-2013	High School: Scientific Diploma at <i>Liceo Scientifico "E. Fermi"</i> , Sulmona (AQ), Italy Mark: 100/100

### Educational courses and workshops

09/2021	Three-day online course on " <i>Machine Learning for Materials Science and Engineering</i> " organized by <i>University of California (UCLA)</i> , Los Angeles, CA, USA
12/2019	Course " <i>I metodi dell'ingegneria a supporto della giustizia</i> " organized by <i>Politecnico di Milano</i> , Milan, Italy

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## 2. Research and work experience

### Post-Doc research scholar at *Politecnico di Milano*, Milan, Italy

2024-present	The Post-Doctoral research enfoldes experimental and computational approaches for designing of suitable bone scaffolds: <ul style="list-style-type: none"><li>- <u>Design algorithms</u> for generating random structures with prescribed properties;</li><li>- <u>Fracture</u> finite element simulations to predict the <u>strength</u> and <u>fracture pattern</u> of 3D printed ceramic architectures;</li></ul>
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### Beam time at the *ISRF*, Grenoble, France

11/2024	XRD analyses on 3D printed ceramic components for the evaluation of residual strains through Laue diffraction.
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### PhD research scholar at *Politecnico di Milano*, Milan, Italy

2020-2024	The PhD research enfoldes the usage of an experimental and computational approach for the design and characterization of ceramic scaffolds for bone tissue engineering applications. The key activities can be resumed as: <ul style="list-style-type: none"><li>- <u>Nanoindentation</u> and <u>micro-bending</u> of glass-ceramic bulk samples for the mechanical characterization at small scales;</li></ul>
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- Optical and confocal laser microscopy for the morphologic characterization of the samples;
- Image processing from computed micro tomography scans.
- Finite element modelling for structural analysis with particular emphasis on the damage propagation (i.e. crack evolution) into micro-structured scaffolds.
- Machine Learning techniques for optimization problem-solving.

The core of the research is based at *Politecnico di Milano*, in collaboration with prestigious institutions (*Politecnico di Torino* and *Università degli Studi di Milano*) and highly specialized companies for the manufacturing of ceramic components (*Lithoz* and *Green Bone*).

### **Visiting Research Period at *Massachusetts Institute of Technology*, MA, USA**

02/2022-07/2022      Development and implementation of computational models aimed at simulating and enhancing toughening methods for ceramic scaffolds. Drawing inspiration from natural structures, the research was centered on investigating innovative approaches to improve the mechanical properties and toughness of these scaffolds.

### **Beam time at *Elettra Sincrotrone*, Trieste, Italy**

12/2021      microCT acquisition of 3D printed ceramic parts for 3D reconstructions.

### **Teaching activities at *Politecnico di Milano*, Milan, Italy**

2024-2024      Teaching assistant in the course Capstone Project (ING-INF/06 - ING-IND/34, 8 CFU), Master of Science Degree in Biomedical Engineering.

2022-2024      Tutoring of projects in the collaborative class between *Politecnico di Milano* and *University of Liegi* in the course of Mechanics of Biological Structures (ING-IND/34, 5CFU), Master of Science Degree in Biomedical Engineering and Materials Engineering and Nanotechnology.

2020-present      Teaching assistant in Continuum Mechanics (ING-IND/34, 8 CFU), Master of Science Degree in Biomedical Engineering.

2020-present      Teaching assistant in Mechanics of Biological Structures (ING-IND/34, 5CFU), Master of Science Degree in Biomedical Engineering and Materials Engineering and Nanotechnology.

### **Reviewer for international journals**

Scientific Reports, PlosONE, Biomechanics and Modeling in Mechanobiology, Computer Methods in Biomechanics and Biomedical Engineering.

### **PhD Evaluation Board**

Member of the PhD Evaluation Committee at the University of Liège for one PhD candidate.

### **Co-supervision of Master Thesis in Biomedical Engineering at *Politecnico di Milano***

2024      *Development of a Novel Soft Scratch Test to Investigate Coating's Mechanical Stability of Coated Films and Drug-Coated Balloons*  
Giovannetti D., Frigerio A.

2024      *Design of a multi-functional Dual-Stage Actuator system for material characterization*  
Ruijs J.

2024      *Strategic placement of pores as a toughening strategy for ceramic scaffolds fixation*  
Souhail H.

- 2024 *Mechanical Properties of 3D printed Hydroxyapatite Scaffolds: Bridging the Gap between Numerical and Experimental Analyses*  
Pascucci L.
- 2023 *Ottimizzazione Multi-Obiettivo di strutture tripli periodiche di scaffold per il tessuto osseo*  
Chiavone R.
- 2023 *Development and testing of Voronoi-based scaffolds for bone tissue engineering with custom properties*  
Goretti G., Magrini G.
- 2023 *Hydraulic bulge test for the mechanical characterization of uncoated and drug-coated polymeric materials constituting angioplasty balloons*  
Fomiatti E., Ferrari M.
- 2022 *Sviluppo di un algoritmo per la creazione di un modello digitale di osso trabecolare*  
Giorgetti G.
- 2022 *Caratterizzazione di uno scaffold in idrossiapatite ottenuto tramite tecniche di stereolitografia*  
Pezzillo L., Tomasi F.
- 2022 *Progettazione automatica di scaffold a struttura tripli-periodica per la riparazione di difetti ossei*  
Ibrahimi S.
- 2022 *Analisi e modellazione di Scaffold in vetro ceramica*  
De Cet A.

### Master thesis research at **Politecnico di Milano, Milan, Italy**

- 2019-2020 Master thesis conducted in partnership between *Politecnico di Milano* and Silk Biomaterials srl, focused on the experimental and computational characterization of the mechanical properties of a silk-based vascular graft under multiaxial stress conditions

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## 3. Scientific Dissemination

### List of publications on peer-reviewed journals

Baino F., Gabrieli R., Verné E., Schiavi A., Schwentenwein M., **D'Andrea L.**, Vena P., *Optimizing the Design and Manufacturing of Bioceramic Scaffolds towards Bone-like Architectures*, Ceramics International (2025), 10.1016/j.ceramint.2025.02.307

**D'Andrea L.**, Gabrieli R., Milano L., Magagnin L., De Cet A., Alidoost D., Schwentenwein M., Verné E., Baino F., Vena P., *Elastic and failure characterization of hydroxyapatite TPMS scaffolds using a combined approach of ultrasound, compression tests and micro-CT based numerical models*, Acta Materialia (2025), 10.1016/j.actamat.2025.120776

**D'Andrea L.**, Yang T., Dao M., Vena P., *Nature-inspired orientation-dependent toughening mechanism for TPMS ceramic architectures*, MRS Bulletin Impact (2025), 10.1557/s43577-024-00831-5

Stratakos E., Tscheuschner L., Vincenzi L., Pedrinazzi E., Sigala F., **D'Andrea L.**, Gastaldi D., Berti F., Tzafriri R., Pennati G., *A novel in silico–ex vivo model for correlating coating transfer to tissue with local drug-coated balloon-vessel contact pressures*, Annals of Biomedical Engineering (2024), 10.1007/s10439-024-03634-6.

Ibrahimi S., **D'Andrea L.**, Gastaldi D., Rivolta M. W., Vena P., *Machine Learning approaches for the design of biomechanically compatible bone tissue engineering scaffolds*, Computer Methods in Applied Mechanics and Engineering (2024), 10.1016/j.cma.2024.116842

De Cet A., **D'Andrea L.**, Gastaldi D., Baino F., Verné E., Örylgsson G., Vena P., *Micro-CT imaging and finite element models reveal how sintering temperature affects the microstructure and strength of bioactive glass-derived scaffolds*, Scientific Reports (2024), 10.1038/s41598-023-50255-5

**D'Andrea L.**, Gastaldi D., Baino F., Verné E., Schwentenwein M., Örylgsson G., Vena P., *Computational models for the simulation of the elastic and fracture properties of highly porous 3D-printed hydroxyapatite scaffolds*, International Journal for Numerical Methods in Biomedical Engineering (2023), 10.1002/cnm.3795

**D'Andrea L.**, Gastaldi D., Baino F., Verné E., Saccomano G., D'Amico L., Longo E., Schwentenwein M., Vena P., *Mechanical characterization of miniaturized 3D-printed hydroxyapatite parts obtained through vat photopolymerization: an experimental study*, Journal of the Mechanical Behavior of Biomedical Materials (2023), 10.1016/j.jmbbm.2023.105760

**D'Andrea L.**, De Cet A., Gastaldi D., Baino F., Verné E., Vena P., *Estimation of elastic modulus, fracture toughness and strength of 47.5B-derived bioactive glass-ceramics for bone scaffold application: a nanoindentation study*, Materials Letters (2023), 10.1016/j.matlet.2022.133783

**D'Andrea L.**, Cardamone M., Bogoni F., Forzinetti E., Enei V., Valle F., Gastaldi D., Vena P., *Anisotropic mechanical response of bovine pericardium membrane through bulge test and in-situ confocal-laser scanning*, Journal of Biomechanical Engineering (2023), 10.1115/1.4056398/6954160/bio-22-1178

**D'Andrea L.**, Gastaldi D., Baino F., Verné E., Massera J., Örylgsson G., Vena P., *Mechanical Properties of Robocast Glass Scaffolds Assessed through Micro-CT-Based Finite Element Models*, Materials (2022), 10.3390/ma15186344

Arnoldi I., Mancini G., Fumagalli M., Gastaldi D., **D'Andrea L.**, Bandi C., Di Venere M., Iadarola P., Forneris F., Gabrieli P., *A salivary factor binds a cuticular protein and modulates biting by inducing morphological changes in the mosquito labrum*, Current Biology (2022), 10.1016/j.cub.2022.06.049

## Contributions to international conferences

The speaker is underlined

Grossman Q., Lê M., **D'Andrea L.**, Gastaldi D., Vena P., Ruffoni D., *Tuning the mechanical properties of architected materials: from sandwich beams to triply periodic minimal surface composite lattices*, 1st International Conference on Bio-joining, Porto 2024

Souhail H., **D'Andrea L.**, De Cet A., Ruffoni D., Vena P., *Strategic placement of pores as a toughening strategy for ceramic scaffolds fixation*, Podium presentation at 29<sup>th</sup> European Congress of Biomechanics, Edimburgh 2024

Colombo M., Kornfellner E., **D'Andrea L.**, De Cet A., Reiningner S., Gastaldi D., Vena P., Moscato F., *Mechanical properties and fracture prediction in ceramic scaffolds produced trough vat-photopolymerization*, Podium presentation at 29<sup>th</sup> European Congress of Biomechanics, Edimburgh 2024

**D'Andrea L.**, Gastaldi D., Vena P., *Voronoi-based ceramic scaffolds with custom properties*, Podium presentation at 29<sup>th</sup> European Congress of Biomechanics, Edimburgh 2024

Baino F., Gabrieli R., Schiavi A., Örylgsson G., Schwentenwein M., **D'Andrea L.**, Vena P., Verné E., *Optimizing the Design and Manufacturing of Bioceramic Scaffolds towards Bone-like Architectures*, The Global Conference "Materials in an Explosively Growing Informatics World", Montecatini Terme 2024

**D'Andrea L.**, Vena P., *Mechanical characterization of 3D printed hydroxyapatite*, Podium presentation at young Ceramists Additive Manufacturing Forum, Tampere 2024

**Gabrieli R.**, Schiavi A., Schwentenwein M., **D'Andrea L.**, Vena P., Verné E., Baino F., *Development and characterization of TPMS hydroxyapatite scaffolds*, 48th International Conference and Expo on Advanced Ceramics and Composites, Daytona Beach 2024

**De Cet A.**, **D'Andrea L.**, Gastaldi D., Vena P., *Fracture of compression-dominated ceramic-based bone scaffold through the phase-field model*, Podium presentation at X International Conference on Computational Bioengineering, Vienna 2023

**D'Andrea L.**, De Cet A., Gastaldi D., Vena P., *Design and finite element analysis of a Voronoi-based ceramic scaffold for bone tissue engineering with enhanced strength*, Podium presentation at X International Conference on Computational Bioengineering, Vienna 2023

**D'Andrea L.**, Yang T., Dao M., Vena P., *Nature-inspired toughening mechanism of 3D-printed hydroxyapatite scaffolds for bone tissue engineering*, Podium presentation at 28<sup>th</sup> European Congress of Biomechanics, Maastricht 2023

**D'Andrea L.**, **De Cet A.**, Gastaldi D., Baino F., Verné E., Örlýsson G., Vena P., *In silico characterization of micro-CT based bioactive glass-ceramic scaffolds*, Podium presentation at 18<sup>th</sup> International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, Paris 2023

**D'Andrea L.**, Ibrahimi S., Gastaldi D., Rivolta M. W., Vena P., *Machine learning based design of triply-periodic minimal surface scaffolds for bone tissue engineering*, Podium presentation at 18<sup>th</sup> International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, Paris 2023

**D'Andrea L.**, Gastaldi D., Baino F., Verné E., Vena P., *Mechanical and morphological characterization of 3D printed hydroxyapatite at micro and nano scale*, Podium presentation at International Conference on Structural Integrity and Reliability of Advanced Materials obtained through Additive Manufacturing, Timisoara & Online 2023

**D'Andrea L.**, Ibrahimi S., Rivolta M. W., Vena P., *Machine learning approaches for the automatic design of micro-architected triply-periodic minimal surface scaffold for bone tissue engineering*, Podium presentation at Materials Research Society Fall Meeting, Boston 2022

**D'Andrea L.**, Baino F., Verné E., Schwentenwein M., Gastaldi D., Vena P., *Experimental mechanical characterization of 3D-printed hydroxyapatite and finite element model implementation of high porous scaffold for bone tissue engineering*, Podium presentation at Materials Research Society Fall Meeting, Boston 2022

**D'Andrea L.**, Vena P., *Finite Element Models of Bioceramic Scaffolds: design and characterization*, Invited Speaker at 1<sup>st</sup> GIMC-SIMAI young, Pavia 2022

**D'Andrea L.**, Gastaldi D., Baino F., Verné E., Vena P., *Mechanical properties of bone tissue engineering glass-ceramic scaffolds assessed through microCT-based finite element models*, Podium presentation at 27<sup>th</sup> European Congress of Biomechanics, Porto 2022

**D'Andrea L.**, Gastaldi D., Baino F., Verné E., Schwentenwein M., Prochaska T., Vena P., *Mechanical properties of bone tissue engineering bioceramic scaffold assessed through microCT-based finite element models*, Podium presentation at IX International Conference on Computational Bioengineering, Lisbon 2022

**D'Andrea L.**, Alloisio M., Costa Angeli M. A., Biagiotti M., Vincoli V., Freddi G., Alessandrino A., Gastaldi D., Vena P., *Biaxial mechanical characterization of silk-based multi-layered vascular graft for small vessels*, Podium presentation at 26<sup>th</sup> European Congress of Biomechanics, Milano 2021



## Other Seminars

*μCT-based modeling of devices for bone tissue engineering – "Current trends in computational modelling" DECODE Webinar 8, Milan 2024*

*Design and Characterization of ceramic scaffolds for Bone Tissue Engineering – Seminar at the Micromechanics class of the Master Degree program in Materials Engineering and Nanotechnology, Politecnico di Milano, Milan 2023*

*Protesi e stampa 3D in medicina veterinaria – Seminario IVSA, Università Statale di Milano, Lodi 2023*

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## 4. Honours and Awards

01/2025	Fully-funded scholarship for the Postgraduate Program (II Level Master) on Multifunctional Metamaterials and Metastructures at University of Trento – <u>3000€</u>
05/2024	Travel Grant at the young Ceramists Additive Manufacturing Forum, Tampere 2024 for the presentation titled "Mechanical characterization of 3D printed hydroxyapatite" – <u>500€</u>
06/2022	Travel Award at 27 <sup>th</sup> European Congress of Biomechanics, Porto 2022 for the presentation titled "Mechanical properties of bone tissue engineering glass-ceramic scaffolds assessed through microCT-based finite element models" – <u>400€</u>
02/2022-07/2022	Grant for a visiting research period at Massachusetts Institute of Technology (MIT) funded by "Progetto Roberto Rocca" focused on a nature-inspired toughening mechanism of brittle porous materials for bone tissue engineering – <u>8000\$</u>
12/2021	Beam-time at "Elettra Sincrotrone Trieste" with the proposal titled "High resolution quantitative Computed tomography of 3D printed glass-ceramic and hydroxyapatite materials for Bone Tissue Engineering scaffolds manufacturing" – <u>72 hours</u>

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## 5. Memberships

2021-present	European Society of Biomechanics (ESB)
2022-2023	Virtual Physiological Human Institute for Integrative Biomedical Research (VPH)
2022-2023	Material Research Society (MRS)

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## 6. Languages

Italian, Native

English, Proficient

<b>Research Interest</b>	Theoretical and Applied Solid Mechanics; Numerical Methods in Computational Mechanics; Non-local (non-classical) Continuum Theories; Fracture Mechanics; Topology Optimization; Multiscale Modelling Approaches; Molecular Dynamics Simulations; Biomechanics: Dental Mechanics and Bone Remodeling		
<b>Skills</b>	Programming in Wolfram Mathematica and MATLAB to develop in-house codes for FEM, Extended FEM, Topology optimization, Concurrent multi-scale modelling of classical and non-classical materials; Preparing and post-processing numerical models in ABAQUS-FEA (ABAQUS /Standard, ABAQUS-Subroutines) for standard stress analysis, simple contact modelling, and bone remodelling; Using LAMMPS Molecular Dynamics Simulator for mechanical characterization of nanostructures; LaTeX Software; Microsoft Office		
<b>Education</b>	<b>Ph. D</b>	02/2013 – 01/2020	Istanbul Technical University, Mechanical Engineering GPA: 3.81/4.00 <i>Thesis:</i> Nonlocal theory of elasticity in nanomechanics and application to multiscale models
	<b>M. Sc</b>	07/2010 – 02/2013	Istanbul Technical University, Solid Mechanics GPA: 4.00/4.00 <i>Thesis:</i> Computer simulation of bone remodeling
	<b>B. Sc</b>	09/2005 – 06/2010	Istanbul Technical University, Shipbuilding and Ocean Engineering GPA: 2.98/4.00 <i>Thesis:</i> Stability analysis of Roll-on/Roll-off (RORO) ships
<b>Experience</b>	<b>Alma Mater Studiorum Università di Bologna</b>		
	Department of Civil, Chemical, Environmental and Materials Engineering, Bologna, Italy	07/2023 – 06/2025	
	<i>Role:</i> Post-Doc Researcher		
	<b>Università degli Studi di Roma “La Sapienza”</b>		
	Department of Structural and Geotechnical Engineering, Roma, Italy	12/2021 – 05/2023	
	<i>Role:</i> Post-Doc Researcher		
	<b>Yaşar University</b>		
	Department of Mechanical Engineering, Izmir, Turchia	09/2020 – 07/2024	
	<i>Role:</i> Assistant Professor		
<i>Given courses:</i> Statics, 126 hours		Sabbatical leave:	
Strenght of Materials, 280 hours		06/2022 – 07/2024	
Mechanical Components, 56 hours			
Senior Design Project I,II			

**Università degli Studi di Roma “La Sapienza”**

Department of Structural and Geotechnical Engineering,  
Roma, Italy

02/2020 – 08/2020

Role: Visiting Ph.D. Researcher

**Istanbul Technical University**

Department of Mechanical Engineering, Istanbul, Turchia

02/2011 – 10/2018

Role: Research and Teaching Assistant

Assisted courses: Strength of Materials, Introduction to  
Finite Element Method, Experimental Methods in  
Mechanical Engineering

**Projects**

“Zero Impact Multifunctional 3D printed composite materials for biomedical and industrial applications in the next generation society (ZIMUX)” Supported by PRIN (Research Projects of National Relevance of Italy), No: 2020F23HZ7 2022 – 2025.

“Modelling of constitutive laws for traditional and innovative building materials” Supported by PRIN (Research Projects of National Relevance of Italy), No:2017HPYKFZ, 2019 – 2023.

“A new optimized design of freight wagons and production of the prototype” Supported by TUBITAK (The Scientific Research Council of Turkey) and TCDD (Turkish State Railways), 2011 – 2014.

**Peer Review**

Early Career Editorial Board (ECEB) Membership: *Computers & Structures*

Referee activities: *Archieve of Applied Mechanics, Journal of Vibration and Control, Mathematics and Mechanics of Solids, International Journal of Engineering Science, Composite Structures, Engineering Structures*

**Publications  
in SCI, SCI-E  
Journals**

**Tuna M.**, Trovalusci P., Fantuzzi N. (2025) An energy-based fracture criterion for quasi-brittle crack propagation in micropolar continuum: Analytical and numerical study. *International Journal of Engineering Science*, 206, 104173.

**Tuna M.**, Trovalusci P., Fantuzzi N. (2025) On quasi-brittle fracture analysis of micropolar plates via XFEM model. *International Journal of Engineering Science*, 206, 104168.

Izadi R., **Tuna M.**, Trovalusci P., Fantuzzi N. (2023) Thermomechanical characteristics of green nanofibers made from polylactic acid: An insight into tensile behaviour via molecular dynamics simulation. *Mechanics of Materials*, 181, 104640.

**Tuna M.**, Trovalusci P. (2022) Topology optimization of scale-dependent non-local plates. *Structural and Multidisciplinary Optimization*, 65, 248.

**Tuna M.**, Trovalusci P. (2021) Stress distribution around an elliptic hole in a plate with ‘implicit’ and ‘explicit’ non-local models. *Composite Structures*, 256, 113003.

Izadi R., **Tuna M.**, Trovalusci P., Fantuzzi N. (2021) Bending characteristics of carbon nanotubes: Micropolar elasticity models and molecular dynamics simulations. *Mechanics of Advanced Materials and Structures*, 30:1, 189-206.

Izadi R., **Tuna M.**, Trovalusci P., Ghavanloo, E. (2021) Torsional characteristics of carbon nanotubes: Micropolar elasticity models and molecular dynamics simulation, *Nanomaterials*, 11:2, 453.

**Tuna M.**, Kirca M. (2021) Unification of Eringen's nonlocal parameter through an optimization based approach. *Mechanics of Advanced Materials and Structures*, 28:8, 839-848.

**Tuna M.**, Leonetti L., Trovalusci P., Kirca M. (2020) 'Explicit' and 'implicit' non-local continuous descriptions for a plate with circular inclusion in tension. *Meccanica*, 55:4, 927-944.

**Tuna M.**, Trovalusci P. (2020) Scale dependent continuum approaches for discontinuous assemblies: 'explicit' and 'implicit' non-local models. *Mechanics Research Communication*, 103, 103461.

**Tuna M.**, Kirca M., Trovalusci P. (2019) Deformation of atomic models and their equivalent continuum counterparts using Eringen's two-phase local/nonlocal model. *Mechanics Research Communication*, 97, 26-32.

**Tuna M.**, Kirca M. (2017) Bending, buckling and free vibration analysis of Euler-Bernoulli nanobeams using Eringen's nonlocal integral model via finite element method. *Composite Structures*, 179, 269-284.

**Tuna M.**, Kirca M. (2017) Respond to the comment letter by Romano and Barretta on the paper "Exact solution of Eringen's nonlocal integral model for bending of Euler-Bernoulli and Timoshenko beams". *International Journal of Engineering Science*, 116, 141-144.

**Tuna M.**, Kirca M. (2016) Exact Solution of Eringen's nonlocal integral model for vibration and buckling of Euler-Bernoulli beam. *International Journal of Engineering Science*, 107, 54-67.

**Tuna M.**, Kirca M. (2016) Exact Solution of Eringen's nonlocal integral model for bending of Euler-Bernoulli and Timoshenko beams. *International Journal of Engineering Science*, 105, 80-92.

**Tuna M.**, Sunbuloglu E., Bozdog E. (2014) Finite element simulation of the behavior of the periodontal ligament: a validated nonlinear contact model. *Journal of Biomechanics*, 47:12, 2883-2890.

**Book Chapter** **Tuna M.**, Ongaro G., Trovalusci P., Fantuzzi N. (2024) Computational Approaches for Crack Propagation in Materials and Structures: Comparison Between Linear Elastic Fracture Mechanics (LEFM) and Peridynamics (PD) Based Strategies. *Comprehensive Mechanics of Materials*, edited by Silberschmidt, 87-103, Elsevier.

**Tuna M.**, Leonetti L., Trovalusci P., Kirca M. (2021) 'Explicit' and 'implicit' Non-local Continuum Descriptions: Plate with Circular Hole. *Size-dependent Continuum Mechanics Approaches*, edited by Ghavanloo E., Fazelzadeh S.A., Marotti de Sciarra F., 311-338, Springer.

**In Press** Ongaro, G., **Tuna, M.**, Trovalusci, P., Fantuzzi, N (2025). Peridynamics and Extended Finite Element Method based techniques for Mixed mode crack propagation in brittle materials. Springer Book Series Advanced Structured Materials.

**Other Journal Papers** Çelik Güven M., **Tuna M.**, Bozdağ E., Öztürk G.N., Bayraktar G. (2017) Comparison of retention forces with various fabrication methods and materials in double crowns. *The Journal of Advanced Prosthodontics*, 9, 308–314.

Imren Y., Gurkan V., Bilsel K., Desteli E.E., **Tuna M.**, Gurcan C., Tuncay I., Sen C. (2016) Biomechanical comparison of dynamic hip screw, proximal femoral nail,

cannulated screw, and monoaxial external fixation in the treatment of basicervical femoral neck fractures. *Acta Chir Orthop Traumatol Cech*, 82, 140-144.

Yildiz F., Kiliçoglu O.I., Dikmen G., Bozdag E., Sunbuloglu E., **Tuna M.** (2016) Biomechanical comparison of oblique and step-cut osteotomies used in total hip arthroplasty with femoral shortening. *Journal of Orthopaedic Science*, 21, 640-646.

Karaca B., Basat S.O., Ozel A., Bozdag E., **Tuna M.**, Sar M., Pilanci O. (2016) The effects of mucoperichondrial flap elevation on septal L-strut cartilage: a biomechanical and histological analysis in a rabbit model. *Plastic and reconstructive surgery*, 137, 1784-1791.

Bilgili F., Balci H.I., Karaytug K., Sariyilmaz K., Atalar A.C., Bozdag E., **Tuna M.**, Bilgic B., Gurler N. (2015) Can normal fracture healing be achieved when the implant is retained on the basis of infection, an experimental animal model. *Clinical Orthopaedics and Related Research*, 473, 3190-3196.

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**International Conferences** **Presentation:**  
2024, Modeling Complexity in Mechanics: Theory, Experiments, and Simulations (Siracusa, Italy)  
2024, 8<sup>th</sup> International Conference on Crack Paths (Rimini, Italy)  
2024, 27<sup>th</sup> International Conference on Composite Structures, (Ravenna, Italy)  
2024, 3<sup>rd</sup> International Conference on Nonlinear Solid Mechanics, (Cagliari, Sardinia, Italy)  
2024, 9<sup>th</sup> European Congress on Computational Methods in Applied Sciences and Engineering (Lisbon, Portugal)  
2023, 3<sup>rd</sup> International Conference on Computations for Science and Engineering (Naples, Italy)  
2023, Nano-Innovation: Conference and Exhibition (Roma, Italy)  
2023, Engineering Mechanics Institute International Conference (Palermo, Italy)  
**Local Staff Member:**  
2024, International Colloquium on Multiscale and Multiphysics Modeling for Advanced and Sustainable Materials, EuroMech Colloquium 642 (Roma, Italy)  
2024, 27<sup>th</sup> International Conference on Composite Structures (Ravenna, Italy)  
**Co-organizer of Mini-Symposium:**  
2025, ECCOMAS 8<sup>th</sup> Young Investigators Conference (Pescara, Italy)  
“Numerical Modelling of Damage Characteristics of Classical and Non-classical Materials”  
2025, 8<sup>th</sup> International Conference on Civil, Structural and Environmental Engineering Computing (Cagliari, Sardinia, Italy)  
“Analytical and Numerical Developments in Fracture Mechanics of Classical and Non-classical Materials”  
2024, 27<sup>th</sup> International Conference on Composite Structures (Ravenna, Italy)  
“New Insights in the Mechanical Modeling of Cultural Heritage for Sustainable Restoration: Green Composites and Nano-Technologies”

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