Alessia Pantaleoni

Home : Via Andrea Bregno n.44, 05022, Amelia, Italy

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Date of birth: 02/08/1996 **Place of birth:** Narni (TR), Italy **Nationality:** Italian

EDUCATION AND TRAINING

[2022 – 29/01/2026] **Ph.D. in Electrical, Materials, and Nanotechnology Engineering (38th cycle)**

University of Rome "Sapienza"- Department of Chemical Engineering Materials Environment

Project: Bio-based surface engineering of natural reinforcements to enhance biocomposite durability and fire performance. Subjects of study and engineering: natural fibers (wool, flax, basalt) and carbon-based reinforcements (hydrochar from lignocellulosic waste), integrated into thermoplastic (PLA) and thermoset (epoxy) matrices. Protocols developed under green chemistry and sustainability principles. Approved for public defense by the Doctoral Board (October 15, 2025); final defense expected by January 2026.

Thesis title: Bio-based surface engineering of natural reinforcements for sustainable, durable, and fire-resistant biocomposites.

[2022] **Master Degree in Molecular and Industrial Biotechnologies (LM-8 –Industrial Biotechnology, D.M. 270/2004)**

University of Perugia - Department of Chemistry, Biology and Biotechnology

Country: Italy | | **Final grade:** 110/110 cum laude, with academic distinction. | **Thesis:** Flame retardants from renewable sources for natural fiber reinforcing composite materials: two different development approaches. Supervisor: Prof. F. Sarasini (University of Rome "Sapienza"), Co-supervisors: Prof. M.P. Bracciale (University of Rome "Sapienza") and Prof. A. Marrocchi (University of Perugia)

[2019] **Bachelor's Degree in Biotechnology (L-2 – Biotechnology, D.M.270/2004)**

University of Perugia - Department of Chemistry, Biology and Biotechnology

| **Final grade:** 105/110 | **Thesis:** Characterization of extracellular vesicle release induced by amiodarone. Supervisor: Prof. Lorena Urbanelli (University of Perugia), Co-supervisor: Carla Emiliani (University of Perugia)

[2015] **Scientific high school graduation**

Istituto di istruzione superiore Gandhi Narni

NETWORKS AND MEMBERSHIPS

[2025 – Current] **Italian Association of Materials Engineering (AIMAT)**

[2025] **Member of the Organizing Committee for the 18th National Conference of the Italian Association of Materials Engineering (AIMAT)**

Hotel Continental Ischia (Ischia, Italy)

PUBLICATIONS

[2025] **Additive Manufacturing of Carbon Fiber Cores for Sandwich Structures: Optimization of Infill Patterns and Fiber Orientation for Improved Impact Resistance**

Reference: J. Manuf. Mater. Process. 2025, 9, 299. https://doi.org/10.3390/jmmp9090299

Authors: C. Tosto; L. Saitta; I. Blanco; G. Fichera; M. Evangelista; J. Jose; A. Pantaleoni; I. Bavasso.

[2025] **Advanced flame-retardant biocomposites: Polylactic acid reinforced with green gallic acid iron phosphorus coated flax fibers**

Reference: Int. J. Biol. Macromol. 2025, 300, 140215. https://doi.org/10.1016/j.ijbiomac.2025.140215
Authors: A. Pantaleoni; F. Nardelli; A. Marrocchi; S. Pizzanelli; M.L. Santarelli; I. Bavasso; P. Russo; A. Freni; G. Malucelli; C. Giannini; M.P. Bracciale; D. Altamura; F. Sarasini

[2025] **Balancing Sustainability and Performance: Bio-Based Epoxy Systems for Durable Flax Fiber-Reinforced Composites**

Reference: Polym. Compos., 2025, 0, 1. https://doi.org/10.1002/pc.70340
Authors: V. Fiore; R. Miranda; I. Kovinchuk; M. Luciano; A. Pantaleoni; I. Bavasso; F. Sarasini

[2024] **Recycling of a commercial biodegradable polymer blend: Influence of reprocessing cycles on rheological and thermo-mechanical properties**

Reference: Polym. Test., 2024, 134, 108418. https://doi.org/10.1016/j.polymertesting.2024.108418
Authors: I. Bavasso; M.P. Bracciale; G. De Bellis; A. Pantaleoni; J. Tirillò; G. Pastore; S. Gabrielli; F. Sarasini

[2024] **Facile and Bioinspired Approach from Gallic Acid for the Synthesis of Biobased Flame Retardant Coatings of Basalt Fibers**

Reference: ACS Omega, 2024, 9, 19099. https://doi.org/10.1021/acsomega.3c10129
Authors: A. Pantaleoni; F. Sarasini; P. Russo; J. Passaro; L. Giorgini; I. Bavasso; M.L. Santarelli; E. Petrucci; F. Valentini; M.P. Bracciale; A. Marrocchi

SKILLS

Mechanical testing

tensile test | flexural test | Interlaminar Shear Strength (ILSS) | low-velocity impact test | Charpy impact test

Thermal and fire testing:

microscale combustion calorimetry (MCC) | differential scanning calorimetry (DSC) | cone calorimetry | thermogravimetric analysis (TGA) coupled with Fourier-transform infrared spectroscopy (TGA–FTIR) | limiting oxygen index (LOI) | dynamic mechanical analysis (DMA)

Rheology

melt flow index (MFI) | rotational rheometry

Microscopy and surface characterization

scanning electron microscopy (SEM) coupled with energy-dispersive X-ray spectroscopy (EDS) | Fourier-transform infrared spectroscopy (FTIR) | Gas Pycnometer | optical microscopy

Materials processing and fabrication

injection molding | melt compounding (Brabender) | twin-screw extrusion

ATTENDED SEMINARS, COURSES, WORKSHOPS, AND SCHOOLS

[2025] **The 3rd European Summer School on the Bio-based Composites (ESBBC) (Cambridge, UK) - University of Cambridge**

16.5 h of lectures, flash talks and workshops (design, IP & ethics, research writing) on bio-based composites, fibres and natural materials; sessions on value chains, design & applications, performance, computational/AI and life-cycle management.

Active participation, with a flash talk titled “Multifunctional Lignin-Modified Wool Fibers for Sustainable Epoxy Composites”.

[2025] **CN4 – Spoke 11 Annual Workshop – Innovative Materials and Lightweighting (Politecnico di Bari - Bari, Italy) - National Center for Sustainable Mobility (MOST)**

Attended the workshop on innovative materials and lightweighting; project updates on WPs 2–6, PoCs and Scalability projects; speakers from universities and industry (Ferrari, Stellantis, Eni Versalis).

[2025] **Seminar on Thermal Analysis and Rheology for the Study of Polymers and Composites - University of Rome “Sapienza” and NETZSCH**

Sessions on DSC, TGA (incl. TGA-FTIR), DMA/TMA, and rotational/capillary rheometry for polymers and composites; academic–industry talks (Sapienza University, NETZSCH, Versalis) and a hands-on lab with NETZSCH software.

[2024] **22nd AIMAT School – “Material Intelligence: from Smart Materials to Artificial Intelligence” (Ischia, Italy) - Italian Association of Materials Engineering**

Lectures and hands-on sessions on intelligent materials & AI (ML/LLMs), 4D printing, multifunctional/self-healing polymers and composites, biomedical applications, fatigue, smart construction, energy storage and self-cleaning coatings.

[2024] **Spring school in Biotechnology (SSB 2024) (Nocera Umbra, Italy) - University of Perugia**

Lectures and roundtables on biomaterials and biodevices with academia–industry networking;

Presented a flash talk titled “Sustainable Green Coating for Natural Fiber: A Flame-Retardant Approach to PLA-Based Composites.”

[2024] **SPOKE 11: Workshop RTDA & SPOKE Meeting (School of Engineering - University of Bologna, Italy) - National Center for Sustainable Mobility (MOST)**

Attended the workshop on innovative materials and lightweighting; sessions across WPs 2–6 (Design & Sustainability; Light Metals; Ferrous Alloys; Polymers; Polymer-Matrix Composites); Spoke progress update and an academia-industry roundtable.

[2023] **Course: "Sapienza Training on Soft Skills for Early-Career Researchers” - University of Rome “Sapienza”**

Six-week cross-disciplinary training on EU funding & proposals, IP/ethics, sci-comm, data management/Open Access (IRIS), ML/DL (PyTorch), entrepreneurship, and research infrastructures.

TRAINING / PROFESSIONAL TRAINING

[2025] **Webinar: "Reactivity and Tg of Epoxy Resins: Influence of Composition and Measurement Method"**

Organizer: NETZSCH

[2025] **Training Course on the Use of the Anton Paar MCT 702e Rotational Rheometer**

Organizer: Anton Paar

[2025] **Training Course on the Use of the Materials Testing Machine AllroundLine Z150**

Organizer: Zwick/Roell

[2025] **Webinar: "Dynamic Mechanical Analysis (DMA) of Polymers and Composites"**

Organizer: NETZSCH

ACADEMIC APPOINTMENTS

[01/12/2025 – 28/02/2026] **Research fellowship**

Institution: Department of Chemical Engineering Materials Environment (DICMA) – University of Rome "Sapienza"

Research activity: Development, manufacturing, and thermo-mechanical characterization of bio-based polymer formulations processed by extrusion and injection molding, incorporating agro-food waste-derived fillers.

[07/2022 – 10/2022] **Research fellowship**

Institution: Research Center in Science and Technology for the Conservation of historical-architectural heritage (CISTeC) at the Department of Chemical Engineering Materials Environment-University of Rome "Sapienza"

Research activity on production of protective or consolidating agents as fire retardants against the risk of fire on architectural monuments (ESA Pomerium project activities).

OTHER APPOINTMENTS

[09/2024 – 12/2024] **Pre-Doctoral visiting Scholar**

Institution: Institute for Materials Research and Innovation (IMRI), University of Greater Manchester

Pre-Doctoral visiting Scholar in the research group of Prof. Baljinder Kandola

Funded by the Sapienza University of Rome Mobility Scholarship (Borsa di Mobilità)

Development and characterization of natural fiber coating systems to enhance flame resistance and durability in composite materials.

[07/2021 – 04/2022] **Thesis trainee**

Institution: Materials Engineering laboratory - Department of Chemical Engineering Materials Environment-University of Rome "Sapienza"

Research activity on the development of phosphorus-based flame retardant (FR) coatings for natural fibers used as reinforcement in composite materials

[04/2019 – 08/2019] **Erasmus trainee**

Institution: Molecular Biology and Cancer Research laboratory of the Institute of Molecular Biology and Tumor Research (IMT) - Philipps-University of Marburg.

Funded by the Erasmus+ Programme (European Union).

Research activity on characterization of p14ARF protein levels and cellular responses to UV or gemcitabine treatment of pancreatic cancer cells.

[08/2018 – 02/2019] **Thesis trainee**

Institution: Molecular Biology laboratory - Department of Chemistry, Biology and Biotechnology- University of Perugia

Research activity on characterization of extracellular vesicle release and cellular responses to amiodarone treatment.

FUNDING INFORMATION [GRANTS AS PI-PRINCIPAL INVESTIGATOR OR I-INVESTIGATOR]

[2024 – 2025] **Powering the circular economy: Hydrochar Flame Retardants from Beer Production Waste for Advanced NFRCs**

Program: Progetto Avvio alla Ricerca Tipo I, n. protocollo AR12419074AEE068, Bando di Ateneo 2024, University of Rome "Sapienza"

Role: PI

Grant value: 1.166 €

[2023 – 2024] **Facile and bioinspired development of a novel bio-based coating from gallic acid of natural fibers for composite applications**

Program: Progetto Avvio alla Ricerca Tipo I, n. protocollo AR123188B06847FC, Bando di Ateneo 2023, University of Rome "Sapienza"

Role: PI

Grant value: 1.000 €

PARTICIPATION IN NATIONAL AND INTERNATIONAL CONFERENCES AS SPEAKER

[2025] **XVIII Convegno Nazionale dell'Associazione Italiana di Ingegneria dei Materiali (AIMAT) (Ischia, Italy)**

Title: Development of Multifunctional Lignin-Coated Wool Fibers for Sustainable Epoxy Composites

[2025] **24th International Conference on Composite Materials (ICCM24) (Baltimore, MD, USA)**

Title: Hydrochar-based flame retardants from Brewers' Spent Grain for high-performance composites

[2025] **7th International Conference on Natural Fibers (ICNF 2025) (Lisbon, Portugal)**

Title: Lignin-based multifunctional coating for advanced wool composites

[2024] **Symposium for Young Chemists: Innovation and Sustainability (Sync 2024) (Rome, Italy)**

Title: A green coating strategy for natural fibres to enhance flame retardancy in PLA composites

[2024] **21th European Conference on Composite Materials (ECCM21) (Nantes, France)**

Title: A green coating strategy for natural fibres to enhance flame retardancy in PLA composites

[2023] **6th International Conference on Natural Fibers (ICNF 2023) (Madeira, Portugal)**

Title: Facile and bioinspired development of a novel bio-based coating from gallic acid of natural fibers for composite applications

CONFERENCE PAPERS [INTERNATIONAL]

[2024] **Sustainable green coating for natural fibers: a flame retardant approach for PLA-based composites**

Reference: Proceedings of the 21st European Conference on Composite Materials - Vol. 3 Material and Structural Behavior (Vol. 3, pp. 393–399). The European Society for Composite Materials. DOI: 10.60691/yj56-np80

Authors: A. Pantaleoni; M.P. Bracciale; I. Bavasso; P. Russo; J. Passaro; L. Giorgini; G. Malucelli; A. Marrocchi; F. Sarasini

[2025] **Hydrochar-based flame retardants from brewers' spent grain for high-performance composites.**

Reference: Proceedings of the 24th International Conference on Composite Materials (ICCM24), (in press).

Authors: A. Pantaleoni; I. Bavasso; M.P. Bracciale; P. Russo; J. Tirillò; G. Malucelli; E. Maccaferri; L. Giorgini; A. Marrocchi; F. Sarasini

RESEARCH ACTIVITIES

Summary of Research Activities

The research activity focuses on improving the performance of biocomposite materials. Specifically, it addresses limited fire resistance through reinforcement surface engineering, implemented via sustainable processes and in accordance with green chemistry principles. A second line targets enhanced durability by engineering the reinforcement surface with natural macromolecules to reduce moisture uptake and enable multifunctional textiles, while simultaneously improving the stability and processability of thermoplastic-matrix composites. The activity further includes durability assessment of bio-based laminates under aggressive conditions (e.g., salt-fog/salt-spray). Within a circular-economy framework, biocomposites reinforced with carbon-based materials derived from lignocellulosic residues are designed and characterized, and the thermomechanical recycling of biodegradable polymer blends intended for single-use products is investigated. Finally, additive-manufacturing parameters for conventional carbon-fiber-reinforced composites are optimized to enhance impact performance.

Keywords

Biocomposites - Flame resistance - Durability - Waste valorization - Surface engineering

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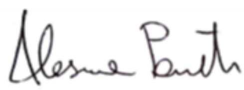

Rome, 12/02/2026

Alessia Pantaleoni