

# Giovanni Lo Bello

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## Profile

PhD candidate in Bioengineering with expertise in nanomaterial synthesis and advanced biomedical applications.

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## Education

**Master's degree in biomedical engineering,** **2019 - 2021**  
'Bionanotechnologies' Politecnico di Torino,

Final grade: 110L/110

**Bachelor's degree in biomedical engineering,** **2016 - 2019**  
'Biomaterials' University of Palermo

Final grade: 105/110

**High School Diploma in Scientific Studies,** **2011 - 2015**  
Liceo Scientifico "S. Cannizzaro", Palermo

Final grade: 85/100

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## Work Experience

**Phd Student,** University of Genoa **Jan 2021 – Present**

**Supervisors: Roberto Raiteri, Laura Pastorino**

- Worked with various types of nanoformulations (carbon dots, bismuth oxide nanoparticles, PCL nanoparticles functionalized with enzymes and antimicrobials and multifunctional mesoporous bioactive glass nanoparticles loaded with metal ions and antimicrobials).
- Experienced in working with cells and bacteria
- Trained in using Atomic Force Microscopy (AFM), to perform high-resolution and morpho-mechanic analyses.

**Part-time Collaborator** (Student Support for Students with **2020 - Present**  
Disabilities), Politecnico di Torino and University of Genoa.  
(TOT = more than 200h)

- Assisted students with disabilities in studying and preparing for exams in biomedical engineering subjects.
- Provided one-on-one academic support to ensure their success in understanding complex concepts and course material.

**PhD Student visitor,** Institute of Biomaterials, Friedrich  
Alexander University

**Nov 2023 – July 2024**

**Supervisor: Aldo Roberto Boccaccini**

- Conducted advanced characterizations of functionalized SiO<sub>2</sub>-CaO mesoporous bioactive glass nanoparticles (MBGNs) combined with selected antimicrobials (Copper + Quercetin, Manganese + Quercetin).
- Verified the enhanced antibacterial activity and stability of nanoparticles compared to bare antimicrobials, utilizing both gram-positive and gram-negative bacteria.
- Evaluated the biocompatibility of the nanoformulations on various cell lines (MG63, MC3T3-E1).
- Characterized PCL-based nanoparticles combined with quercetin.
- Assessed biocompatibility and antibacterial activity of PCL-based nanoparticles.

**Scientific Facilitator, Genoa Science Festival**

**2021-2024**

- Presented the topic: "*Why reproduce the development of tissues in the laboratory?*", demonstrating how cells communicate and develop in a controlled environment using a BioX bioprinter.
- Printed models of an aorta, an ear, and simple geometric structures to explain the concept to the audience.
- Demonstrated the decellularization process on spinach leaves.

**Research Fellow, Department of Molecular Medicine, University of Pavia**

**Nov 2020- Jan 2021**

**Supervisor: Livia Visai**

- Developed and characterized different 3D hydrogel systems made of alginate and mucin.
- Assessed cells viability upon contact with the 3D system.
- Evaluated the viral titer of the reference variant of SARS-CoV-2 (D68G) upon contact with the hydrogel and cells.
- Prepared the hydrogel using the bacterial secretome of *S. aureus* as a solvent for alginate and mucin.
- Conducted biochemical, bioengineering, and chemical-physical analyses of various 3D gel systems.

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**Teaching Activities**

**Co-advisor of 3 Master's Students, University of Genoa, Politecnico of Milan**

**2022 – Present**

- Supervised the thesis: "Development of new nanoparticle-based strategies for the removal of bacterial biofilms" (University of Genoa); Master degree program in Bioengineering: "*Materials and devices for personalized medicine*"
- Supervised the thesis: "Application of atomic force microscopy (AFM) on histological tumors samples as support for the study of meningiomas" (University of Genoa, Politecnico of Milan); Master degree program in Bioengineering.

- Supervised the thesis: “Application of atomic force microscopy (AFM) as a tool to investigate the effect of different nanoformulations for the removal of bacterial biofilms” (University of Genoa); Master degree program in Bioengineering: “*Materials and devices for personalized medicine*”.

**Teaching Assistant** for "Biosensors and Microsystems"; Master degree program in Bioengineering: “*Materials and devices for personalized medicine*”.

(TOT = 40 h)

University of Genoa

**Supervisor: Roberto Raiteri**

**2021- 2023**

- Designed and developed an amperometric enzymatic biosensor with a mediator for measuring glucose concentration, including a disposable strip and an external circuit for portable device integration. Laboratory setup involved using a generator and an ammeter connected to a computer for data collection and visualization.
- Verified the sensor's selectivity.
- Performed cyclic voltammetry to determine the optimal oxidation potential of PQ.
- Identifying the calibration curve.
- Determining glucose concentration in an unknown sample.

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## Projects

### **PhD Student for the Synthesis Of Green-Based Anti-Biofilm Nanoformulations Against Bacterial Contaminations in Nosocomial Environments**

**Supervisors: Roberto Raiteri, Laura Pastorino**

- Synthesis of PCL-COOH NPs functionalized with  $\alpha$ -amylase enzyme and quercetin to obtain antibacterial activity
- Morphological characterization of the nanoformulation using SEM, AFM, DLS, Zsizer, Nanosight
- Tested local activity of this nanoplatform on four different strains of S. aureus biofilms using AFM
- Investigated cytotoxicity on MC3T3-E1 cells.

### **PhD Student for Multifunctional Mesoporous Bioactive Glass Nanoparticles for Advanced Biomedical Applications**

**Supervisor: Aldo Roberto Boccaccini**

- Conducting advanced characterizations on functionalized SiO<sub>2</sub>-CaO mesoporous bioactive glass nanoparticles (MBGNs) with combined selected antimicrobials (Copper + Quercetin, Manganese + Quercetin). XRD, FTIR, DLS, and Zsizer.
- Verifying the increased efficacy in antibacterial activity and stability of the aforementioned nanoparticles compared to bare antimicrobials, utilizing both gram-positive and gram-negative bacteria.

- Evaluating the biocompatibility of these nanoformulations on various cell lines.
- Characterizing PCL-based nanoparticles combined with Quercetin, assessing their biocompatibility and antibacterial activity.

### **Research Fellow for Chemical-physical and biological analysis of 3D gels for Covid-19 testing**

**Supervisor: Livia Visai**

- Developed a 3D hydrogel at varying concentrations of alginate and mucin, tested on a cell line to assess cell viability.
- Evaluated the viral titer of the reference variant of SARS-CoV-2 (D68G) upon contact with the hydrogel and cells.
- Prepared the hydrogel using the bacterial secretome of *S. aureus* as a solvent for alginate and mucin.
- Conducted biochemical, bioengineering, and chemical-physical analyses of various 3D gel systems.

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### **Attendance at International and National Conferences**

- CESB-2024, 8th China-Europe Symposium on Biomaterials in Regenerative Medicine Nuremberg, Germany from 15th to 18th September 2024 (**Poster Presentation**). *“Multifunctional Mesoporous Bioactive Glass Nanoparticles for Advanced Biomedical Applications” Giovanni Lo Bello et al.*
- 13th International Colloids Conference 9-12 June 2024 Sitges, Spain (**Poster Presentation**). *“Green-based multitarget nanoformulations to prevent biofilm contaminations In nosocomial environments” Giovanni Lo Bello et al.*
- Graduate School in scanning probe microscopy and the AFM&SPM 2024 conference held 25-28 March 2024 at Durham University (**Oral Presentation**). *“Green-based Multitarget Nanoformulations To Prevent Biofilm Contaminations In Nosocomial Environments” Giovanni Lo Bello et al.*
- VIII Congress of the National Group of Bioengineering (GNB) 21-23 June 2023 Centro Altinate San Gaetano, Padua, Italy (**Poster Presentation**). *“Green-Based Anti-Biofilm Nanoformulations Against Bacterial Contaminations In Nosocomial Environments” Giovanni Lo Bello et al.*
- Break Biofilms Workshop held in Vienna, January 16 – 18, 2023 (**Poster Presentation**). *“Green-Based Multitarget Nanoformulations To Prevent Biofilm Contaminations In Nosocomial Environments” Giovanni Lo Bello et al.*
- ESA Topical Team: Biofilms from an interdisciplinary perspective (Acronym: Biofilms) FALL 2022 meeting November 24-25 2022 ESTEC/ESA Noordwijk, The Netherlands.
- AFM BioMed Summer School 11-15 July 2022, Marseille (**Summer School**).

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## Software Skills

- Microsoft Office (Word, Excel, PowerPoint, Outlook)
- MATLAB and Simulink
- AutoCAD
- SolidWorks
- OriginLab
- GraphPad

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## Hard Skills

- Proficient in synthesis and characterization techniques for nanoparticles (XRD, FTIR, DLS, Zsizer, AFM).
- Skilled in conducting advanced physicochemical and biological analyses.
- Experienced in working with complex 3D systems, including cell culture environments.

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## Soft Skills

- **Analytical Thinking:** Proven ability to deconstruct complex problems, analyze data, and draw meaningful conclusions, especially in the context of nanoparticle synthesis and complex 3D systems.
- **Adaptability and Resilience:** Demonstrated capacity to adapt to diverse research environments, including international collaborations and interdisciplinary projects, with resilience under challenging timelines.
- **Communication and Presentation Skills:** Effective in presenting complex scientific concepts in clear and engaging ways, as seen in scientific animations and teaching support roles for students.
- **Collaboration and Teamwork:** Strong collaborator across roles in academia, from lab-based projects to international research visits, able to foster productive teamwork while independently driving project goals.
- **Problem Solving:** Skilled in troubleshooting technical issues during experimental procedures, adapting protocols as necessary, and identifying solutions in high-stakes lab work.
- **Time Management and Project Planning:** Efficient in managing multiple responsibilities, such as PhD research, teaching assistance, and scientific animations, meeting deadlines and advancing research goals systematically.

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## Languages

- Italian (Native)
  - English (IELTS 5.5)
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## Publications

- [1] G. Lo Bello, M. Bartoli, M. Giorcelli, M. Rovere, A. Tagliaferro, A Review on the Use of Biochar Derived Carbon Quantum Dots Production for Sensing Applications, *Chemosensors* 10 (2022). <https://doi.org/10.3390/chemosensors10030117>.
- [2] E. Restivo, E. Peluso, N. Bloise, G. Lo Bello, G. Bruni, M. Giannaccari, R. Raiteri, L. Fassina, L. Visai, Surface Properties of a Biocompatible Thermoplastic Polyurethane and Its Anti-Adhesive Effect against *E. coli* and *S. aureus*, *J Funct Biomater* 15 (2024). <https://doi.org/10.3390/jfb15010024>.
- [3] G. Lo Bello, E. Dellacasa, G. Damonte, D. Caviglia, A.M. Schito, R. Raiteri, O. Monticelli, M. Sartini, M.L. Cristina, P. Laura, Green-Based Anti-Biofilm Nanof formulations Against Bacterial Contaminations In Nosocomial Environments, under review. <https://www.cell.com/heliyon/home> <https://ssrn.com/abstract=4951689>.
- [4] Tesi di Laurea Magistrale: G. Lo Bello, POLITECNICO DI TORINO CORSO DI LAUREA IN INGEGNERIA BIOMEDICA Sintesi e caratterizzazione di Carbon Dots coniugati con particelle a base di Bismuto Ossido. <https://webthesis.biblio.polito.it/19602/>