

Amalia D'Avino

I am a 25-year-old Materials Engineer, always passionate about scientific subjects, in particular chemistry, the reason for choosing this field of study. I am precise and organized, I always look for new challenges to learn and grow both personally and professionally. Committed and motivated researcher with a background in materials science. I have a track record of conducting innovative research, publishing articles in respected journals, and presenting my findings at international conferences.

Education:

- **MSc in Materials Engineering** at University of Naples 'Federico II'
Thesis: Synthesis of Thermo-reversible epoxy resin and characterization through thermo and mechanical tests. The software TA Analysis, Microsoft Excel and OriginPro8.5 were used to data analysis. Microsoft word and ChemBioOffice2018 were used to write thesis's elaborate.
Evaluation: 110/110 with honors
- **BSc in Materials Science and Engineering** at University of Naples, 'Federico II'
Thesis: Polymeric Aerogels Nanocomposites: preparation techniques and structure-property relationships
Evaluation: 110/110 with honors
- **Scientific high school at "E.Torricelli"** in Somma Vesuviana (NA)
Evaluation: 97/100

Work & Research Experience:

- **Research Scientist at Italian National Research Council**
Pozzuoli (NA), ITALY
[March 2022 – Present]

Research Projects:

1. Photo-Piezo-ActUators (PULSE-COM) [2019 – 2023]:

European project focused on creating innovative photo-activated devices using photo-mobile polymer films and lead-free piezoelectric materials. This project aims to revolutionize existing paradigms and explore new applications in the realm of photo-activated piezoelectricity, opening doors to diverse and unexplored possibilities.

In this project, I actively participated in the production of photoresponsive films, enhancing both the production process and characterization methodologies. Throughout this experience, I gained proficiency in using various instruments, including the spin coater, rubbing machine, lasers, and detectors for power measurement, optical microscope, and atomic force microscope (AFM).

2. Actuators based on Light sensitive Composite (ALICE) [2022 – 2024]:

The Eureka! - funded Proof of Concept Project, ALICE (Actuators based on Light sensitive Composite), focuses on exploring photo-mobile polymers as smart materials, advancing their production via 3D/4D printing. Its primary goal is to employ these materials as actuators in solar tracking systems, spanning both photovoltaic and concentrated solar applications.

I am personally involved in the **chemical development and optical characterization of the photo-mobile polymers**. Furthermore, starting from August 2023, I have been appointed as WP leader to focus more closely on the marketing aspects of both the resin and the final printed product. In this new role, I am acquiring skills in financial management, the responsibility of completing this part monthly and presenting it to investors, as well as managing the new human resources that assist me in this aspect of the project.

3. SERS-Cov-Advanced Nanobiosensing platforms for diagnostics and POC surveillance [2022 – 2023]:

The project is dedicated to the development and validation of a diagnostic system which, exploiting the use of vibrational optical spectroscopy (SERS- Surface Enhanced Raman Spectroscopy) and, the use of both innovative materials engineered by the CNR group, defined as metasurfaces "HyperMeta enantiomeric molecules" and self-assembled monolayers of gold nanoparticles obtained with a bottom-up synthesis strategy, targets to evaluate the presence of the SARS Covid virus in a specific way.

In this project, I participated in the **production of gold substrates**, learning the synthesis of gold nanoparticles and the self-assembly process to create a gold coating for silicon wafers. Additionally, I acquired skills in the use of Surface-Enhanced Raman Spectroscopy (SERS) to assess the sensor's effectiveness in detecting the virus. I also learned to use Electron Beam Lithography (EBL) to manufacture the metasurfaces.

4. PRIN 2022 - SENSOSTEC Development of a plasmonic nanobiosensor for the rapid diagnosis of Shiga toxin producing E. coli human infections at the point of care [2023 – 2025]:

The project is dedicated to the development and validation of a diagnostic system which, exploiting the use of vibrational optical spectroscopy (SERS- Surface Enhanced Raman Spectroscopy) and, the use of both innovative materials engineered by the CNR group, defined as metasurfaces "HyperMeta enantiomeric molecules" and self-assembled monolayers of gold nanoparticles obtained with a bottom-up synthesis strategy, targets to evaluate the presence of the Shiga toxin virus in a specific way. In this project, I participated in the **production and characterization of gold substrates**. Additionally, I acquired skills in the use of Surface-Enhanced Raman Spectroscopy (SERS) to assess the sensor's effectiveness in detecting the

virus. I also learned to use Electron Beam Lithography (EBL) to manufacture the metasurfaces.

- **Internship at DICMAPI's Chemical Laboratory of Federico II University of Naples [March 2021 –June 2021]**

Optimization of conditions and synthesis modes of thermoreversible systems through FTIR Analysis using the software PerkinElmer Spectrum.

- **Library assistant at DICMAPI's library of Federico II University of Naples [December 2018 –September 2019]**

During this experience, I gained skills related to working in a library, organizing and cataloging books, as well as the procedures for book lending.

Publications:

1. **Title:** Development of LCEs with 100% Azobenzene Moieties: Thermo-Mechanical Phenomena and Behaviors
Authors: Domenico Sagnelli, Massimo Rippa, Amalia D'Avino, Ambra Vestri, Valentina Marchesano, Lucia Petti
Journal: MDPI
Year: 2022
DOI: <https://doi.org/10.3390/mi13101665>
2. **Title:** Mechanical properties and reprocessability of Diels-Alder-based reversible networks from furan-modified resins
Authors: Angela Marotta, Martina Salzano de Luna, Amalia D'Avino, Mattia Fornaro, Giovanni Filippone, Veronica Ambrogio
Journal: Journal of Applied Polymer Science
Year: 2022
DOI: <https://doi.org/10.1002/app.52796>
3. **Title:** Photomobile Polymer-Piezoelectric Composite for Enhanced Actuation and Energy Generation
Authors: Domenico Sagnelli, Amalia D'Avino, Massimo Rippa, Ambra Vestri, Valentina Marchesano, Giuseppe Nenna, Fulvia Villani, Gustavo Ardila, Sonia Centi, Fulvio Ratto, Lucia Petti
Journal: American Chemical Society
DOI: <https://doi.org/10.1021/acsaom.3c00227>

Conferences:

4. **Title:** Optimization of PMP films' preparation and mechanical properties using ZnO nanoparticles as dopant
Authors: Amalia D'Avino, Domenico Sagnelli, Ambra Vestri, Massimo Rippa, Valentina Marchesano, Veronica Ambrogio, Anna De Girolamo, Fausta Loffredo, Fulvia Villani, Giuseppe Nenna, Lucia Petti
Conference: SPIE Optics + Optoelectronics, 2023, Prague, Czech

Republic

DOI: <https://doi.org/10.1117/12.2665616>

- 5. Title:** Visible photomobile response of azobenzene-based polymer/carbon black films
Authors: A. De Girolamo Del Mauro, F. Loffredo, F. Villani, M. F. Caso, T. Fasolino, A. Vestri, D. Sagnelli, A. D'Avino, L. Petti, G. Nenna
Conference: SPIE Optics + Optoelectronics, 2023, Prague, Czech Republic
DOI: <https://doi.org/10.1117/12.2666618>
- 6. Title:** Photo-mobile polymers in energy harvesting applications under simulated solar light
Authors: W. Andrysiewicz, D. Wojcieszczak, R. Socha, D. Sagnelli, A. D'Avino, L. Petti
Conference: SPIE Optics + Optoelectronics, 2023, Prague, Czech Republic
DOI: <https://doi.org/10.1117/12.2666931>
- 7. Title:** Optimization of photomobile polymer films' production by ZnO nanoparticles and silver nanocuboids doping
Authors: D'Avino A., Sagnelli D., Vestri A., Rippa M., Marchesano V., De Girolamo Del Mauro A., Loffredo F., Villani F., Nenna G., Ratto F., Ambrogi V., Petti L.
Conference: 109° Congresso SIF, Salerno 2023
DOI: <https://2023.congresso.sif.it/talk/70>
- 8. Title:** Investigation and parametric optimization of laser surface texturing for improved microparticles non-sticking capacity
Authors: Saccone G., Favalaro N., Petti L., Vestri A., D'Avino A.
Conference: 75th International Astronautical Congress 2024 IAF MATERIALS AND STRUCTURES SYMPOSIUM (C2) Interactive Presentations - IAF MATERIALS AND STRUCTURES SYMPOSIUM (IP)
Paper ID: 84013

Skills:

Digital skills:

Microsoft Office | PerkinElmer Spectrum | COMSOL Multiphysics | OriginPro8.5 | TA Analysis | MATLAB | ChemBioOffice2018 |

Soft skills:

Team-work oriented | Motivated | Organizational and Planning skills | Written and Verbal skills | Analytical skills



Languages:

- Italian: mother tongue
- English: fluent

I hereby give consent for my data included in the curriculum vitae to be processed for recruiting purposes.