Omissis

Federica Granata

Omissis

PROFESSIONAL SUMMARY

Biomedical Engineer with a PhD in Information Engineering, specialized in the design, fabrication, and characterization of micro- and nano-structured photonic devices for advanced biomedical applications. The research activity focused on the integration of optically functionalized photonic and plasmonic structures with microfluidic systems for biomarker detection and tumor cell recognition, using advanced optical analysis techniques, including Surface-Enhanced Raman Spectroscopy (SERS). Expertise includes numerical simulations, clean-room micro- and nanofabrication techniques, optical characterization, and experimental validation of integrated optofluidic systems. Strong experience in international research collaborations, including an extended research and training period at Vrije Universiteit Brussel (VUB), leading to the award of the Doctor Europaeus title. Proven ability to work effectively within heterogeneous scientific teams, independently manage experimental activities, and contribute to complex collaborative research projects.

PROFESSIONAL EXPERIENCE

- **Research Fellowship**
  Project: PE_RESTART_Spoke_1_IIT
  Host Institution: Institute of Applied Sciences and Intelligent Systems “E. Caianiello” (ISASI) – National Research Council (CNR)
  Period: November 2024 – November 2025
  Main Activities: Development of dielectric structures for integrated photonic circuits and optical modulators.

- **Training and Career Orientation Internship**
  Host Institution: Institute of Applied Sciences and Intelligent Systems “E. Caianiello” (ISASI) – National Research Council (CNR)
  Period: May 2021 – October 2021
  Main Activities: Design, fabrication, and characterization of microfluidic circuits for advanced biomedical applications, with integration of plasmonic devices for optical sensing. Numerical simulations, microfabrication techniques, and optical characterization methodologies.

- **Research Internship / Training Internship**
  Host Institution: Institute of Applied Sciences and Intelligent Systems "E. Caianiello" (ISASI) – National Research Council (CNR); University of Naples Federico II
  Period: September 2020 – March 2021
  Main Activities: Design, fabrication, and characterization of microfluidic circuits for advanced biomedical applications. Numerical simulations, microfabrication techniques, and optical characterization methodologies.

EDUCATION

- **PhD in Information Engineering *(Doctor Europaeus)***

"Mediterranea" University of Reggio Calabria
[01/04/2025]
Website: https://www.unirc.it
Fields of study:Photonics, Nanomaterial, Nano and micro strucutre, Microfluidics, Biosensing, Flexible Materials, Optics, Optofluidics
PhD Thesis: *Development of Capillary-Based Flexible Biosensor Microsystems for Advanced Biomedical Applications*

- **Master's Degree in Biomedical Engineering (Laurea Magistrale)**

University of Naples Federico II
[24/03/2021]
Address: Piazzale Vincenzo Tecchio, 80, 80125 Naples, Italy
Website: http://www.unina.it
Field of study: Biomedical Engineering
Final grade: 110/110

- **Bachelor's Degree in Biomedical Engineering (Laurea Triennale)**

University of Naples Federico II
[28/01/2019]
Address: Piazzale Vincenzo Tecchio, 80, 80125 Naples, Italy
Website: http://www.unina.it
Field of study: Biomedical Engineering
Final grade: 102/110
Thesis: *Collective Migration*

PROFESSIONAL QUALIFICATION

- **Professional Qualification as Engineer**

Awarding institution: University of Salento
Professional title: Industrial Engineer – Section A
Date obtained: July 2021

INTERNATIONAL TRAINING AND RESEARCH EXPERIENCE

- **Research Stay at Vrije Universiteit Brussel (VUB)** – Brussels, Belgium

Duration: 10 months

During my research period at the Vrije Universiteit Brussel (VUB), I focused on the investigation of capillary phenomena applied to cryo-electron microscopy (cryo-EM) measurements. In particular, I designed optimized

cryo-EM grids aimed at improving the spreading and distribution of biological samples, enabling more accurate and reliable imaging results

LIST OF RESEARCH OUTPUTS

- **Journal Articles**

Title: ***Optimization of Microfluidic Functionalization of a Plasmonic-Based Device for Selective Capture of Anti-Folic Acid in Solution***
Product type: Journal Article
Authors: Federica Granata, Roberta Costa, Maria Laura Coluccio, Natalia Malara, Antonio Minopoli, Mario Iodice, Paola Cuzzola, Giuseppe Coppola, Francesco Gentile
Author's contribution: First author (numerical simulations, fabrication, characterization, and manuscript writing)
Journal: *Biosensors and Bioelectronics: X*
Year of publication: 2022
Volume / Article number: Volume 12, 100226
DOI: https://doi.org/10.1016/j.biosx.2022.100226

Title: ***Synthesis of Plasmonic Gold Nanoparticles on Soft Materials for Biomedical Applications***
Product type: Journal Article
Authors: Federica Granata, Noemi Pirillo, Alessandro Alabastri, Andrea Schirato, Luigi Bruno, Roberta Costa, Natalia Malara, Valentina Onesto, Maria Laura Coluccio, Mario Iodice, Giuseppe Coppola, Francesco Gentile
Author's contribution: First author (synthesis, deposition, characterization, and manuscript writing)
Journal: *Micro and Nano Engineering*
Year of publication: 2023
Volume / Article number: Volume 19, 100207
DOI: https://doi.org/10.1016/j.mne.2023.100207
Open Access: The article is freely and openly accessible on the publisher's platform.

Title: ***A Generalized Analytical Model for Investigating Flow Dynamics Influenced by Wall Wettability in Capillary-Driven Microfluidics***
Product type: Journal Article
Authors: Federica Granata, Mario Iodice, Giuseppe Coppola
Author's contribution: Co–first author and corresponding author (analytical modeling, numerical simulations, experimental validation, and manuscript writing)
Journal: *Microfluidics and Nanofluidics*
Year of publication: 2025
Volume / Article number: Volume 29, Article 69
DOI: https://doi.org/10.1007/s10404-025-02821-8
Open Access: The article is freely and openly accessible on the publisher's platform.

Title: ***Flexible Plasmonic Polymeric Membranes Consisting of Gold Nanoparticle Clusters as a Platform for Biomedical Sensing***
Product type: Journal Article
Authors: Federica Granata, Maria Laura Coluccio, Andrea Schirato, Alessandro Alabastri, Luigi Bruno, Cristina Laurini, Luigi Scalisi, Edmondo Battista, Giuseppe Coppola, Francesco Gentile
Author's contribution: First author (conceptualization, device fabrication and characterization, and manuscript writing)
Journal: *ACS Applied Nano Materials*
Year of publication: 2025
Volume / Pages: Volume 8, 14016–14028

DOI: https://doi.org/10.1021/acsanm.5c01405
Open Access: The article is freely and openly accessible on the publisher's platform.

- **Conference proceedings**

Granata, F. (2024). *Development and Applications of Flexible Plasmonic Devices for Biochemical Applications*.
Proceedings of SPIE, PC13008, *Biophotonics in Point-of-Care III*, PC130080B.

Esposito, F., Rashidi, A., Sacco, A., Vitagliano, C., Granata, F., Srivastava, A., Campopiano, S., Coppola, G., Giordano, M., Di Prisco, G., Sansone, L., Iadicicco, A. (2025). *Bacterial Biofilm Detection Using a Fiber Optic Mach–Zehnder Interferometer*.
Proceedings of SPIE, Volume 13639, *29th International Conference on Optical Fiber Sensors*, 1363995.

PARTICIPATION IN NATIONAL AND INTERNATIONAL SCIENTIFIC CONFERENCES AND EVENTS

•Italian Conference on Optics and Photonics (ICOP 2022)
Oral Presentation
Title: *Optimization of Microfluidic Functionalization of a Plasmonic-Based Device for Selective Surface-Enhanced Raman and Fluorescence Analysis of Biological Samples*
Authors: Federica Granata, Mario Iodice, Francesco Gentile, Giuseppe Coppola

• Annual Meeting of the Italian Electronics Society (SIE)
Poster Presentation
Title: *Optimization of Microfluidic Functionalization of a Plasmonic-Based Device for Surface-Enhanced Raman and Fluorescence Analysis of Biological Samples*
Authors: Federica Granata, Mario Iodice, Francesco Gentile, Giuseppe Coppola

• BioCube Meeting 2022
Oral Presentation
Title: *Optimization of Microfluidic Functionalization of a Plasmonic-Based Device for Surface-Enhanced Raman and Fluorescence Analysis of Biological Samples*
Authors: Federica Granata, Mario Iodice, Francesco Gentile, Giuseppe Coppola

• MAP WHISKIES Meeting – European Space Agency (ESA), ESTEC, The Netherlands
Oral Presentation
Title: *Multifunctional Systems: Integration of Optical Sensors in Fluidic Structures*
Authors: Federica Granata, Mario Iodice, Francesco Gentile, Giuseppe Coppola

• XXII National Conference on Sensors and Microsystems (AISEM 2024), Bologna, 7–9 February 2024
Oral Presentation
Title: *Development of a Flexible Plasmonic Device for Biochemical Detection*
Authors: Federica Granata, Mario Iodice, Francesco Gentile, Giuseppe Coppola

• SPIE Photonics Europe 2024, Strasbourg, 12–16 April 2024
Oral Presentation
Title: *Development and Applications of Flexible Plasmonic Devices for Biochemical Applications*
Authors: Federica Granata, Mario Iodice, Francesco Gentile, Giuseppe Coppola

• Italian Conference on Optics and Photonics (ICOP 2024)
Oral Presentation

Title: *Development of a Flexible Plasmonic Device for Biochemical Detection*
Authors: Federica Granata, Mario Iodice, Francesco Gentile, Giuseppe Coppola

• **Eurosensor 2025**, Wroclaw, Poland
Oral Presentation
Title: *Fiber Optic Sensors Based on Mach–Zehnder Interferometer for the Detection of Bacterial Biofilms*
Authors: Attena Rashidi, Flavio Esposito, Adriana Sacco, Federica Granata, Anubhav Srivastava, Carmine Vitagliano, Stefania Campopiano, Michele Giordano, Giuseppe Coppola, Gennaro Di Prisco, Lucia Sansone, Agostino Iadicicco

• **29th International Conference on Optical Fiber Sensors (OFS29)**
Oral Presentation
Title: *Bacterial Biofilm Detection Using a Fiber Optic Mach–Zehnder Interferometer*
Authors: Flavio Esposito, Attena Rashidi, Adriana Sacco, Carmine Vitagliano, Federica Granata, Anubhav Srivastava, Stefania Campopiano, Giuseppe Coppola, Michele Giordano, Gennaro Di Prisco, Lucia Sansone, Agostino Iadicicco

• **Annual Meeting of the Italian Electronics Society (SIE 2025)**, Naples, Italy
Oral Presentation
Title: *Gold Nanoparticle Cluster-Integrated Flexible Polymeric Membranes for Advanced Biomedical Sensing Applications*
Authors: Federica Granata, Maria Laura Coluccio, Andrea Schirato, Alessandro Alabastri, Luigi Bruno, Cristina Laurini, Luigi Scalisi, Edmondo Battista, Giuseppe Coppola, Francesco Gentile

• **Annual Meeting of the Italian Electronics Society (SIE 2025)**, Naples, Italy
Oral Presentation
Title: *In-Fiber Mach–Zehnder Interferometers for Sensing Biofilms*
Authors: Attena Rashidi, Flavio Esposito, Adriana Sacco, Federica Granata, Anubhav Srivastava, Carmine Vitagliano, Stefania Campopiano, Michele Giordano, Giuseppe Coppola, Gennaro Di Prisco, Lucia Sansone, Agostino Iadicicco

• **International Conference on Micro and Nano Engineering (MNE 2024)**
Oral Presentation
Title: *Gold Nanostructures: A Route for Their Assembly on Flexible Devices*
Authors: Francesca Cutuli, Cristina Laurini, Paola Cuzzola, Edmondo Battista, Natalia Malara, Federica Granata, Giuseppe Coppola, Francesco Gentile, Maria Laura Colucci

CERTIFICATIONS FOR PARTICIPATION IN WORKSHOPS, DOCTORAL SCHOOLS, AND TRAINING COURSES

• **Organic Electronics: Principles, Devices and Applications**
Lecturer: Prof. Dario Natali
Institution: Politecnico di Milano
Date: February 2022

• **Nanotechnology and Nanosensors**
Lecturer: Prof. Hossam Haick
Platform: Coursera (Technion – Israel Institute of Technology)
Date: April 2022

• **Negative Staining (SOP) – Training**
Institution: Vrije Universiteit Brussel (VUB), Brussels, Belgium
Instructor: Marcus Fislage
Date: April 2023

• **Cryo-EM Training**
Institution: Vrije Universiteit Brussel (VUB), Brussels, Belgium
Instructor: Marcus Fislage
Date: May 2023

• **Bio-Electron Cryogenic Microscopy (BECM)**
Institution: Vrije Universiteit Brussel (VUB) – Center for Structural Biology (VIB), Brussels, Belgium
Instructor: Marcus Fislage
Date: June 2023

• **12th Advanced Study Course on Optical Chemical Sensors (ASCOS 2022)**
Date: October 2022
Location: Obergurgl, Austria

• **BioCube Meeting 2022**
Date: December 2022
Location: Sestriere, Italy

PARTICIPATION IN OUTREACH AND SCIENCE DISSEMINATION ACTIVITIES

- **Futuro Remoto** (23 November 2024)

Title of the presentation: *"riCREO Equilibria: Between Light, Artificial Intelligence and Nanotechnologies — From Science to Everyday.*

- **European Researchers' Night** (30 September 2022)

Dissemination activity on nanomaterials with optical properties.

- **Futuro Remoto** (29 November 2021)

Title of the presentation: *"Light Beyond the Senses: Optical Pathways Toward the Discovery of New Technologies"*

SEMINARS AND LECTURES DELIVERED

• **Seminar on Optical Sensors with a Focus on Plasmonic Devices**, delivered as invited speaker within the Master's Degree Programme in Biomedical Engineering, University of Naples Federico II – December 2023.

LANGUAGE SKILLS

Mother tongue: Italian
Other languages:
English

- Listening: C1
- Reading: C1
- Writing: C1
- Spoken production: B2
- Spoken interaction: B2

DIGITAL SKILLS

- Proficient in the use of Microsoft Office tools (Word, Excel, PowerPoint, etc.).
- Advanced use of scientific and engineering software (MATLAB, COMSOL Multiphysics, C++, LaTeX, etc.).

Autorizzo il trattamento dei miei dati personali presenti nel CV ai sensi dell'art. 13 d. lgs. 30 giugno 2003 n. 196 - "Codice in materia di protezione dei dati personali" e dell'art. 13 GDPR 679/16 - "Regolamento europeo sulla protezione dei dati personali".

Napoli 16/12/2025

Firma

Firma autografa omessa ai sensi dell'art. 3 d.lgs. 39/1993.