Curriculum Vitae
CATERINA DALLARI, PhD

Consiglio Nazionale delle Ricerche – Istituto Nazionale di Ottica (CNR-INO)
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PROFESSIONAL EXPERIENCES:

My research focuses on the development and integration of innovative nanomaterials with advanced spectroscopic and microscopic techniques to create next-generation optical sensors for early-stage disease diagnosis through molecular screening of biological fluids. During my PhD, I designed and synthesized a range of metallic nanoparticles and developed precise functionalization strategies to enable their use as highly selective capture probes for trace analytes in complex biological matrices. Subsequently, I contributed to the integration of spectroscopic and microscopic detection methods within lab-on-a-chip platforms, with the aim of enhancing sensitivity, while reducing costs and complexity of analysis.

RESEARCH EXPERIENCE:

- **Researcher TD III level** - [02/2024 – present]

National Institute of Optics - National Research Council (INO-CNR)

- **Postdoctoral Fellowship** - [11/2022 – 01/2024]

Department of Physics - University of Florence

- **PhD visiting student** – [09/2021- 12/2021]

Leibniz institute of photonic technology (IPHT), Jena, Germany

- **Research Scholar** - [02/2019- 10/2019]

University of Florence, European Laboratory for Non-Linear Spectroscopy (LENS)

INTERNSHIPS – VISITING:

- Institute of Physics of Belgrade (IPB), **Belgrade**, Serbia – [08/2023]
- Leibniz institute of photonic technology (IPHT), **Jena**, Germany [09/2021 –12/2021)

AWARDS AND RESEARCH SUPPORT:

2025 - Principal investigator within the project AGYR 2024 “A novel SERS-based device for the early-stage diagnosis of Alzheimer’s Disease through blood samples screening” promoted by AIRALZH Foundation. Total funding: 50.000,000 €.

2025 - Special Mention for PhD thesis “Premio Tesi di Dottorato di Ricerca STEM” – CTNA

2024 - Best oral presentation, ISODAYS

2023 – Travel Grant – Women in Photonics, Leibniz IPHT, Jena

2023 – Ocean Insight Young Investigator Award – Photonics West, SPIE Conference, San Francisco (California)

2021 - Best oral Presentation – MacroGiovani

2019 - Graduation Award for Master Thesis

2019 - Travel Grant – VISPEC2019

SPECIAL ISSUE EDITOR:

Sensing and Bio-Sensing Research (Elsevier) – [06/2025 – Ongoing]

INSTITUTIONAL ROLES AND COMMITTEES

Member of the Gender Equality Plan (GEP) Working Group, LENS – [10/2024 – Ongoing]

TEACHING

University of Florence, Department of Physics and Astronomy – [09/2019 – Ongoing]

including

- Academic tutor at the University of Florence for the course B006506 - CHIMICA" of the Laurea Triennale (DM 270/04) in Fisica e Astrofisica; course B031957 - CHIMICA ANALITICA APPLICATA CON LABORATORIO" of the Laurea Triennale (DM 270/04) in CHIMICA (B025)
- Seminario B033600 (B058) – FONDAMENTI DI BIOFOTONICA E BIOFISICA TISSUTALE (Laurea Magistrale in *Fisica della Materia*, curriculum D34, a.a. 2024–2025).
- Seminario B034677 (B411) - Foundations of Biophotonics and Tissue Biophysics (Laurea Magistrale in *Fisica della Materia*, curriculum D34, a.a. 2025–2026).
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TECHNOLOGY TRANSFER ACTIVITIES

Co-founder and member of the Scientific Committee of NSight Dynamics S.r.l., academic spin-off of the University of Florence

EDUCATION:

- PhD in Molecular and Atomic Photonics - [04/2023]

European Laboratory for Non-Linear Spectroscopy, University of Florence.

- Master's degree in Physical Chemistry LM54- [12/2018]

Department of Chemistry, "Ugo Schiff", University of Florence (Italy); 110/110 cum laude

- Degree in Chemistry L27 - [09/2016]

Department of Chemistry, "Ugo Schiff", University of Florence (Italy); 110/110

KEY RESEARCH SKILLS:

- Chemical synthesis: Synthesis (organic and inorganic chemistry); cells culture; analyse body fluids; Optical set-up customization; Advanced knowledge about metallic and magnetic nanoparticles synthesis; Superparamagnetic iron oxide nanoparticles (SPIOs) synthesis; Fabrication of sensors; microfluidic and optofluidic devices; experience with polymeric materials microfluidics and soft lithography

- Spectroscopic Techniques: UV/Vis; fluorescence; Fourier Transform Infrared Spectroscopy (FTIR); Dynamic Light Scattering (DLS); Zeta-Potential; Trasmission Electron microscopy (TEM)

- Microscopic Techniques: confocal fluorescence; Raman confocal microscope ; total-internal reflection microscope.

- Informatics: OS Windows and Microsoft Office;, data analysis (OriginLab), Adobe Photoshop, ImageJ for images visualization and analysis; Vancouver subtraction algorithm; Spectragryph

COURSES:

Pre-incubation course at the Incubatore Universitario Fiorentino (IUF) aimed at setting up innovative startups for placing research results on the market.

PRESENTATIONS AND SEMINARS:

2025 Catania, Italy – Incontro di Spettroscopia Analitica (ISA) “High throughput evanescent-wave biosensor for the early-stage detection of biomarkers in liquid biopsies”

2025 Bressanone, Italy – SINDEM2025 “A novel SERS-based device for the early-stage diagnosis of Alzheimer's disease through blood samples screening” - invited

2025 San Sebastian, Spain – GoldConference “LipoGold tags as game-changer multifunctional probes for SERS-based applications”

2025 San Francisco, California - Photonics West “High throughput evanescent-wave biosensor for the early-stage detection of biomarkers in liquid biopsies”

2024 Rome, Italy - International Conference of Raman Spectroscopy (ICORS) “LipoGold tags as game-changer multifunctional probes for SERS-based applications”

2024 Florence, Italy – ISODAYS2024 “LipoGold tags as game-changer multifunctional probes for SERS-based applications”

2024 Kopaonik, Serbia - Photonics Workshop “Evaluating abnormal levels of intracellular cholesterol through Raman and Surface-enhanced Raman spectroscopy"

2023 San Francisco, California - Photonics West "Multilayered nanoparticles as optical sensors for ß-amyloid peptide (1-42) targeting in liquid samples"

2023 Jena, Germany – Women in Photonics “Smart optical assay based on novel bioorthogonal SERS nanoprobes for the ß-amyloid peptide quantification”

2023 Belgrade, Serbia - Photonica23 "Smart optical assay based on novel bioorthogonal SERS nanoprobes for the ß-amyloid peptide quantification"

2022 Los Angeles, California- International Conference of Raman Spectroscopy (ICORS) “Microfluidic devices for SERS targeting of biomolecules in liquid samples”

2021 Genoa, Italy - MacroGiovani 2021 “3D-printing of optofluidic devices for high-sensitive detection of pathological biomarkers in liquid biopsies”

2021 Online - European Biosensor Symposium (EBS) seminar on Raman-based biosensing “Plasmonic-based sensors for SERS detection of biological fluids"

2020 Strasbourg, France (online) - SPIE, Photonics Europe “3D-printing of multifunctional optofluidic systems for high-sensitive detection of pathological biomarkers in liquid biopsies”

2019 Munich, Germany - European Conferences on Biomedical Optics, ECBO “Disposable and versatile optical sensors for SERS analysis of liquid samples by fiber-based spectroscopy"

POSTERS:

2019 Brescia, Italy - Vispec Conference “Real-time SERS analyses of liquid samples through cap-shaped optical sensors”

2018 Florence, Italy - ICOBSI (INTERNATIONAL CONFERENCE ON BIO SENSING AND IMAGING) “Real-time SERS analyses of liquid samples through cap-shaped optical sensors”

PUBLICATIONS:

2025 “Scalable synthesis of self-assembled magneto-plasmonic core-satellite nanoparticles for microfluidic sorting and bioorthogonal sensing of targeted cells”. Mattii F., Feregotto G., Muzzi B., Pavone F.S., Calamai M., Capitini C., Dallari C.*, Credi C. (2025) Colloids Surf. B. Biointerfaces. 256:115040. (*corresponding author*)

2025 “A Compact Prism-Based Microscope for Highly Sensitive Measurements in Fluid Biopsy”. Perego L.,* Dallari C.,* Falciani C., Pini A., Gardini L., Credi C., Pavone F.S (2025), Journal of Biophotonics 18 (4). (*first co-author*)

2025 “Evaluating pathological levels of intracellular cholesterol through Raman and surface-enhanced Raman spectroscopies”. Baria E.*, Dallari C. **, Mattii F., Pavone F.S., Credi C., Cicchi R., Morrone A., Capitini C., Calamai M. (2024) Sci Rep. 14:28566. (*first co-author and corresponding*)

2024 “LipoGold Tags: Hybrid Lipid-AuNP Clusters as Highly Efficient SERS substrates for Biomedical Applications” Cardellini J.*, Dallari C.*, Riccio L, De Santis I, Ceni C, Morrone A, Calamai M, Pavone FS, Credi C, Montis C, Berti D. Nature Communications **15**, 7975 (2024). (*first co-author*)

2024 “Gold-Hydrogel Nanocomposites for High-Resolution Laser-Based 3D Printing of Scaffolds with SERS-Sensing Properties”. Ventisette I., Mattii F., Dallari C., Capitini C., Calamai M., Muzzi B., Pavone F.S., Carpi F., Credi C. (2024) ACS Appl Bio Mater. 7:4497-4509.

2024 “Oxime Linked Doxorubicin Glycoconjugates Improve the Specific Targeting of Glioblastoma in High-Grade Glioma Therapy”. Iorio A. L, Lenci E., Marzano C., Bucaletti E., Tirinnanzi B., Casati G., Giunti L., Dallari C., Credi C., Sardi I., Trabocchi A. (2024) ACS Medicinal Chemistry Letters

2023 “Multilayered Bioorthogonal SERS Nanoprobes Selectively Aggregating in Human Fluids: A Smart Optical Assay for β-Amyloid Peptide Quantification” Dallari C., Lenci E., Trabocchi A., Bessi V., Bagnoli S., Nacmias B., Credi C., Pavone F. S. ACS Sensors, 2023, 8, 10, 3693–3700. (*first author*)

2023 “Fiber-Based SERS-Fluidic Polymeric Platforms for Improved Optical Analysis of Liquids” Credi C., Dallari C., Nocentini S., Gatta G., Bianchi E., Wiersma D.S. and Pavone F. S. Bioengineering 2023, 10, 676.

2022 “Design and synthesis of novel Raman reporters for bioorthogonal SERS nanoprobes engineering” Innocenti R.,* Dallari C.,* Lenci E., Trabocchi A., Pavone F. S. and Credi C. International Journal of Molecular Sciences, 2022, 23, 5573. (*first co-author*)

2022 Patent: "NANOPARTICELLA RAMAN ATTIVA PER SPETTROSCOPIA SERS, IN PARTICOLARE PER LA RIVELAZIONE DI ANALITI ALTAMENTE DILUITI IN CAMPIONI LIQUIDI E RELATIVI APPARATO E METODO PER SPETTROSCOPIA SERS" Dallari C, Credi C, Innocenti R, Lenci E, Trabocchi A, Pavone F S. priority number *102022000027336*

2022 “Design, synthesis and biological evaluation of RGD peptidomimetic – gold nanostar conjugates” Dallari C.,* Innocenti R.,* Lenci E., Pavone F. S., Bianchini F., Credi C. and Trabocchi A. Bioorganic Chemistry, Volume 16, 2022, 105873. (*first co-author*)

2021 “Gold Nanostars Bioconjugation for Selective Targeting and SERS Detection of Biofluids” Dallari C., Capitini C., Calamai M., Trabocchi A., Pavone F. S., Credi C. (2021) Nanomaterials (Basel) 11:665. (*first author*)

2020 “Nanostars—decorated microfluidic sensors for surface enhanced Raman scattering targeting of biomolecules” C. Dallari, C. Credi, E. Lenci, A. Trabocchi, R. Cicchi, and F.S. Pavone; Journal of Physics Photonics 2, 024008 (2020). (*first author*)

2020 “Fiber-cap biosensors for SERS analysis of liquid samples” C. Credi, O. Bibikova, C. Dallari, B. Tiribilli, F. Ratto, S. Centi, R. Pini, V. Artyushenko, R. Cicchi, and F.S. Pavone; Journal of Material Chemistry B, (2020)

CONFERENCE PAPERS:

2025 “3D-printed microfluidic platforms integrating bioorthogonal magnetoplasmonic nanoclusters for analytes separation and SERS-biosensing”. Feregotto G., Mattii F., Capitini C., … Dallari C., Credi C. Progress in Biomedical Optics and Imaging – Proceedings of SPIE.

2025 “High throughput evanescent-wave biosensor for the early-stage detection of biomarkers in liquid biopsies” C Dallari, L Perego, L Gardini, C Credi, FS Pavone Optical Diagnostics and Sensing XXV: Toward Point-of-Care Diagnostics, PC133160G

2025 “Photoswitchable opto-Lab-on-a-Chip for real-time and label-free cell analysis via classical and quantum holographic imaging” F Torrini, JR Torres, C Dallari, T Pajic, S Savic, D Pavlovic, M Rojas.. Credi C. 18th Photonics Workshop, 51

2024 “High throughput evanescent-wave biosensor for the early-stage detection of biomarkers in liquid biopsies” C Dallari, L Perego, L Gardini, C Falciani, C Credi, FS Pavone. Optical Coherence Tomography, JM4A. 23

2023 “Multilayered nanoparticles as optical sensors for amyloid ß-peptide (1-42) targeting in liquid samples” C Dallari, E Lenci, A Trabocchi, V Bessi, S Bagnoli, B Nacmias, C Credi, Pavone F.S. Colloidal Nanoparticles for Biomedical Applications XVIII 12395, 62-66

2023 “Versatile SERS-fluidic platforms for optical analysis of liquids” Credi, C., Dallari, C., Gatta, G., Bianchi, E., Nocentini, S., Wiersma, D.S., Pavone, F.S. Progress in Biomedical Optics and Imaging - Proceedings of SPIE, 2023, 12387

2023 “Citrate-capped gold nanoparticles as colorimetric sensors for amyloid ß peptide (1-42) targeting in liquid samples” Dallari, C., Lenci, E., Trabocchi, A., Bessi, V., Bagnoli, S., Nacmias, B., Credi, C., Pavone, F.S. Progress in Biomedical Optics and Imaging - Proceedings of SPIE, 2023, 12395

2020 “3D printing of multifunctional optofluidic systems for high-sensitive detection of pathological biomarkers in liquid biopsies” C Credi, C Dallari, E Lenci, A Trabocchi, S Nocentini, D Wiersma, Biophotonics in Point-of-Care 11361, 113610A

2020 “3D-printing of multifunctional optofluidic systems for high-sensitive detection of pathological biomarkers in liquid biopsies” C. Credi, C. Dallari, E. Lenci, A. Trabocchi, S. Nocentini, D. Wiersma, R. Cicchi, and F. S. Pavone. Proceedings of SPIE - The International Society for Optical Engineering 11361,113610A.

2019 “Disposable and versatile optical sensors for real-Time SERS analysis of liquid samples by fiber-based spectroscopy” C. Credi, O. Bibikova, **C. Dallari,** B. Tiribilli, F. Ratto, S. Centi, R. Pini, V. Artyushenko, R. Cicchi, and F. S. Pavone. Proceed. SPIE 10872, 108720Z (2019)

DATE and LOCATION SIGNATURE

18/12/2025, Firenze