

Dr. Barbara Fazio - Curriculum vitae

PERSONAL INFORMATION

Family name, First name: **Fazio, Barbara**

Researcher unique identifier(s):

Scopus Author ID: 7003899204; WoS Researcher ID: AAT-7767-2020 and O-2841-2015; Orcid ID: orcid.org/0000-0002-1947-1123.

Date of birth: **December 7th, 1974**

Nationality: **Italian**

• CURRENT POSITION

From 2022, May 11th Senior Researcher at the URT “LabSens of Beyond Nano” of the Department of Physical Sciences and Technologies of Matter (DSFTM, Messina) of the Italian National Research Council (CNR)/Italy.

• PREVIOUS POSITIONS

2019 – 2022 Senior Researcher (*Permanent staff*)/ Institute for Physical and Chemical Processes (IPCF- Messina)/ Italian National Research Council (CNR)/Italy.

2001 – 2019 Researcher (*Permanent staff*)/Institute for Physical and Chemical Processes (IPCF- Messina)/ Italian National Research Council (CNR)/Italy

1997 – 2001 Industrial researcher (*Permanent staff*)/ Central Research &Development/ STMicroelectronics Catania/Italy.

• EDUCATION

1997 Master (Degree) in Physics, Department of Mathematics, Computer Sciences, Physics and Earth Sciences/ University of Messina, grade 110/110 (summa cum laude). Thesis work titled: “Sintesi di nanoparticelle in ambiente confinato: evidenze EXAFS e di spettroscopia IR”. In collaboration with the “Institute of Spectroscopic Techniques” (ITS) - Italian National Research Council”. The experimental data were collected at GILDA beamline (European Synchrotron Radiation Facilities (ESRF) - Grenoble (France))

• FELLOWSHIPS

2019 Winner of the “**Giovan Pietro Grimaldi prize 2019**” for Physics. Award received from “Fondazione Grimaldi” in collaboration with the “Accademia Gioenia” of Catania/Italy.

• QUALIFICATIONS

2018 - current National Scientific Qualification as Full Professor in Italian Universities (02/B1, Experimental physics of matter.

• PROJECT RESPONSIBILITIES

- **Research Unit responsible** for the URT LabSens (CNR DSFTM-Messina) into the PNRR project “*Integrated Infrastructure Initiative in Photonic and Quantum Sciences – I-PHOQS*” (Rafforzamento e creazione di Infrastrutture di Ricerca, Missione 4 - Componente 2 - Linea di investimento 3.1) – budget of the research unit (U.O. 08) = 5.700.000 €.

- **Research Unit responsible** for the URT LabSens (CNR DSFTM-Messina) into the PNRR project “*Sicilian MicronanoTech Research And Innovation Center - SAMOTHRACE*” (Ecosistema dell’Innovazione - ECS00000022, Missione 4 - Componente 2 - Linea di investimento 1.5) – budget of the research unit = 82.178,12€
- **CNR unit coordinator** for the project "Fractal silicon-nanowire materials for next generation optical devices" founded by Royal Society grants (RSC–CNR International Exchanges Award), from 01/09/2016 to 31/08/2018.

Participant in 29 projects (19 national and 10 international projects) including 2 funded by the European Union.

- **INSTITUTIONAL RESPONSIBILITIES:**

LABORATORIES:

- 2021 – current **Scientific and technical responsibility** of the “Laboratory of optical imaging and spectroscopy” / URT LabSens (DSFTM- Messina)/ Italian National Research Council (CNR)/Italy.
- 2021 – current **Scientific and technical responsibility**, for the CNR part, of the “Joint Optical Laboratory Lab2” (joint laboratory between STMicroelectronics, CNR-Beyond Nano and University of Messina) /located at the CHIBIOFARAM department of the University of Messina.
- 2021 – 2022 **Scientific and technical responsibility** of the “Laboratory of Spectroscopic techniques II (Raman spectroscopies)” / Institute for Physical and Chemical Processes (IPCF- Messina)/ Italian National Research Council (CNR)/Italy.
- 2017 – 2022 **Scientific and technical responsibility** of the laboratory “Light propagation in disordered media”/ Institute for Physical and Chemical Processes (IPCF- Messina)/ Italian National Research Council (CNR)/Italy.

LEADERSHIP OF ACTIVITIES AND WORKING GROUPS:

- 2022 – current **Scientific referent** for the Activity “*Advanced Spectroscopy for Photonic Sensors*” (A 2.10) within the Workpackage 02 - *Multiscale, multidimensional spectroscopy* (PNRR- IPHOQS project)/ URT LabSens (DSFTM- Messina)/ Italian National Research Council (CNR)/Italy.
- 2022 – current **Scientific referent** for the the Sub-Task Activity **4.1.4 Sensitive spectroscopic detection based on plasmonic nanostructures**” within the “Task 4.1 Nanomaterials-based Biosensing devices” of the Workpackage “WP4 – HEALTH. Materials and micro-nanotechnologies for health applications (Spoke 4)” (PNRR- SAMOTHRACE project)/ URT LabSens (DSFTM- Messina)/ Italian National Research Council (CNR)/Italy
- 2022 – current **Scientific referent** for the collaboration activities with STMicroelectronics for the optical characterization of microelectronics devices/ URT LabSens (DSFTM- Messina)/ Italian National Research Council (CNR)/Italy.
- 2000 – 2001 **Section head** of the process integration group (**8 people**) (*Permanent staff*)/ Central Research &Development/ STMicroelectronics Catania/Italy.
- 1999 – 2000 **Team leader** of process modules development (*Permanent staff*)/ Central Research &Development/ STMicroelectronics Catania/Italy.
- 1997 – 2000 Process Engineer – **responsible for** “dielectric layer fabrication by Chemical Vapour Deposition (CVD) techniques” (*Permanent staff*)/ Central Research &Development/ STMicroelectronics Catania/Italy.

- **SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS AND TUTOR ACTIVITIES**

- 2018 – 2019 Supervisor of Dr. Giovanna Ruello within the grant "Studio e caratterizzazione di reperti di interesse storico artistico mediante tecniche spettroscopiche avanzate quali SERS ed RBS" - Project "STBIC -Scienza e Tecnologia per il Recupero e la Fruizione di beni di interesse culturale" - call P.O. FSE 2014-2020.
- 2014 – 2015 Co - supervisor of 1 degree thesis in Physics (Student: Giulia Bertino), Title: "Silicon Nanowires decorated by Ag Nanoparticles for SERS detection".
Department of Physics and Astronomy/ University of Catania/ Italy.
- 2008 – 2009 Tutor activities in formative stages Tutor activities in formative stages for **1** student (Francesco Domenico Nucera) of MSc in Chemistry at the University of Messina: Nanotechnologies and SERS (theoretical and experimental course). 200 hrs, from 01-04-2008 to 31-01-2009.
- 2004 Tutor activities in formative stages for **2** students (Elsa Livoti & Letteria Schirò) of Bachelor in Physics at the University of Messina: Laser cooling (theoretical and experimental course). 45 hrs (5 CFU). From 21-06-2004 to 30-06-2004.

- **TEACHING ACTIVITIES**

- 2020 – 2020 Seminars (4 hrs) at the course "Photonics" /MSc in Physics, / Department of Physics and Astronomy "Ettore Majorana"/ University of Catania/ Italy
- 2017 – 2020 Teaching assistant of "Physics 1"(S.S.D. FIS/01)/ Department of Chemical, Biological, Pharmaceutical and Environmental Sciences/ University of Messina/Italy
- 2016 – 2017 Teacher at the course of "Raman spectroscopy" (14 hrs), at the "XXXII ciclo di dottorato in fisica"/ Department of Physics and Astronomy "Ettore Majorana"/University of Catania/ Italy
- 2012 – 2013 Teacher at 2nd Level Master Course on "Nanotecnologie per le energie sostenibili, II EDIZIONE" / Department of Electrical, Electronics and Telecommunications Engineering, Chemical Technologies, Automation and Mathematical Models / University of Palermo/ University of Palermo/ Italy.

- **ORGANIZATION OF SCIENTIFIC MEETINGS & SCHOOLS**

- 2024 Member of "Scientific Committee" at the school on "New Trends in Photonics Applications, Catania, November 11-15, 2024"
- 2015 Member of "Local Organizing Committee" at the 2nd International Conference on Enhanced Spectroscopies (ICES 2015) / Italy (Messina)
- 2013 Member of "Local Organizing Committee" at the International "Symposium on Ionic Liquids" / Italy (Messina)

- **REVIEWING ACTIVITIES**

- 2020 - 2021 Editorial Board of the Special issue "Nanostructured Materials for Photonics and Plasmonics", Nanomaterials (MDPI)
- 2017 –2017 Scientific Evaluation of the PhD thesis "Surface- and Tip-Enhanced Raman Spectroscopy of biomolecules", PhD Student: Antonino Foti/ XXIX PhD in Physics / University of Messina/ Italy
- 2016 –2016 Scientific Evaluation of the PhD thesis "Silicon Nanowires: the route from synthesis towards applications", PhD Student: Maria Josè Lo Faro/ XXIX PhD in Materials Science and Nanotechnology / University of Catania/ Italy
- 2015 – today Review panel member of **CERIC-ERIC** (European Research Infrastructure Consortium established by European Commission Implementing Decision 392/2014/EU)

2004 – today projects.
Reviewer for international journals of Springer Nature, Springer, AIP,
ACS, Wiley, Elsevier, De Gruyter, MDPI

TEN YEARS TRACK-RECORD

Field of specialization: Experimental Physics (Structure of matter and Optical Physics) with main interests in Light scattering processes, elastic and inelastic; Raman spectroscopy of complex systems, biomolecules and biomaterials, and nanostructured materials for *plasmonics* and *photonics*. Development of optical biosensors and optical setup.

- Study of light transport phenomena in nanostructured disordered systems with short and long range correlations (fractal systems) and study of their optical properties: light field enhancement and interference effects in elastic and inelastic scattering regime (Raman scattering).
- Study of nanostructured materials for Photonics and Plasmonics by optical spectroscopy and light scattering. Comprehension of field enhancement phenomena typical of optically resonant metallic nanostructures (SERS by nanoantennas). Development of SERS (Surface Enhanced Raman Scattering) sensors for high sensitive detection of biomolecules (on substrate or in liquid environment). Development of optical sensors compatible with silicon technology.
- Study of morphological, structural and dynamic properties of a novel class of salts, Room temperature ionic Liquids (RTILs), and their binary mixtures. This study was performed by Infrared absorption, light scattering techniques (Raman scattering).
- Study of chemical-physical properties of semiconductor oxides for catalytic applications.

Invited talks and seminars:

33 oral contributions as *speaker* to national and international workshops and conferences, among them 19 as *invited speakers*:

Papers:

131 publications: 111 papers on JCR journals, 12 no JCR journals, 8 book chapters. The papers have received more than 3400 Citations on Scopus (more than 4100 on Google Scholar).

Among which: 1 paper published on journals with I.F. = 35 (Nature Photonics)

7 papers published on journals with $10 \leq IF \leq 25$

[2 papers published as cover stories, including “**Laser & Photonics Review**” and “**Semiconductor Science and Technology**”. 1 paper published as back cover story on “**Nature Photonics**”].

Patents:

2 US-Patents world-wide extended:

- 1) “Self-planarizing process for shallow trench isolation”, Fazio B., Currò G., Nastasi N., United States Patent 6,573,152 ; published in June, 3, 2003. **Also, European Patent** 1093158; April, 18, 2001. **(Exclusive industrial exploitation by STMicroelectronics).**
- 2) “Fabrication process of a trench power MOS transistor with scaled channel”, Currò G., Fazio B. United States Patent 6,887,760; published in May, 3, 2005.

Google Scholar H-Index: 34

Scopus H-Index: 31

ISI-WoS H-Index: 31

Messina, 03/10/2024