

***BRIDGING GLOBAL CHALLENGES WITH LOCAL  
SOLUTIONS: FOSTERING COLLABORATION BETWEEN  
RESEARCH & BIO NANOTECHNOLOGICAL SERVICE  
CENTER TO TACKLE COMPLEX PROBLEMS''***



### ***Mission:***

The University Service Center for Research and Innovation in Bio and Nanotechnologies supervises the use of sophisticated technical-scientific equipment, providing a highly qualified interdisciplinary service to the structures of the University of Catania and to public and private structures in the national territory, supporting the research activities in bio and nanotechnology carried out at the University.



The Center is equipped with two laboratories:

***Biotech  
laboratory***

***Nanotech  
laboratory***

Each of which is developed on three platforms suitable for synergistic research activities. It has its own specialized technical staff and enjoys administrative autonomy.

***It was designed to:***

Promote the availability of scientific equipment that can be shared between different research groups at the University of Catania due to the high purchase and maintenance costs and the complexity of management.

Facilitate the creation and presentation of research projects for research groups at the University of Catania for funding.



Encourage relationships between the academic component of the University of Catania and companies, the world of work and industrial research and development.

Facilitate advanced training and information activities aimed at the bio and nanotechnological sector.



three technological platforms:

## *Genomics and Transcriptomics*



- Bioanalyzer
- High Throughput Real-Time PCR System
- Illumina MiSeq Sequencer
- Microarray Spotting System
- nCounter System

## *Proteomics*



- Biomolecular imager
- Mass Spectrometer combined with UHPLC
- Protein purification system
- Spectral Scanning Multimode Reader
- Ultracentrifuga Sorvall WX Ultra 100

## *Signaling*



- Confocal Microscope Leica TCS SP8
- Hybrid Multi-Mode Reader
- Imaging Flow Cytometer Amnis FlowSight
- Inverted Microscope Leica DMI4000
- Molecular and particle size analyzer
- UPLC Chromatography
- Upright Microscope Leica DM5500

The currently available expertise enables global genomic analyzes and proteomic characterization, parallel quantitative analyzes of transcripts and proteins, analysis of neurotransmitters and metabolites, cellular and biomolecular analysis using flow cytometry and contemporary imaging, biochemical assays using spectrophotometry and spectrofluor. A microscopy service is also present within the signaling platform, which includes instrumentation for confocal microscopy.

three technological platforms:

## ***GROWTH***



- 3D Printer
- Atomic Layer Deposition
- Heated Platen Press
- Mini Injection Moulding
- Nanofiber electrospinning system
- Single and Twin Extruders

## ***CHARACTERIZATION***



- Confocal Raman - AFM SNOM
- Dynamic Light Scattering
- FT-IR Imaging System
- Rheometer
- Spectrofluorometer
- X-ray Diffractometer
- X-ray Photoelectron Spectroscopy (XPS)

## ***PROTOTYPING***



- Dual Beam Focused Ion Beam
- Electron Beam Lithography
- Molecular Film Deposition
- Reactive Ion Etching

Creation and characterization of micro- and nanostructured materials for applications in electronics and photonics, innovation in intelligent multifunctional surfaces and research on cultural heritage.

## Some BRIT scientific output from Nano to Bio:

# Design, synthesis and characterization of new nanoparticles and evaluation of their biocompatibility in anticipation of drug delivery.

## Red light-triggerable nanohybrids of graphene oxide, gold nanoparticles and thermo-responsive polymers for combined photothermia and drug release effects†

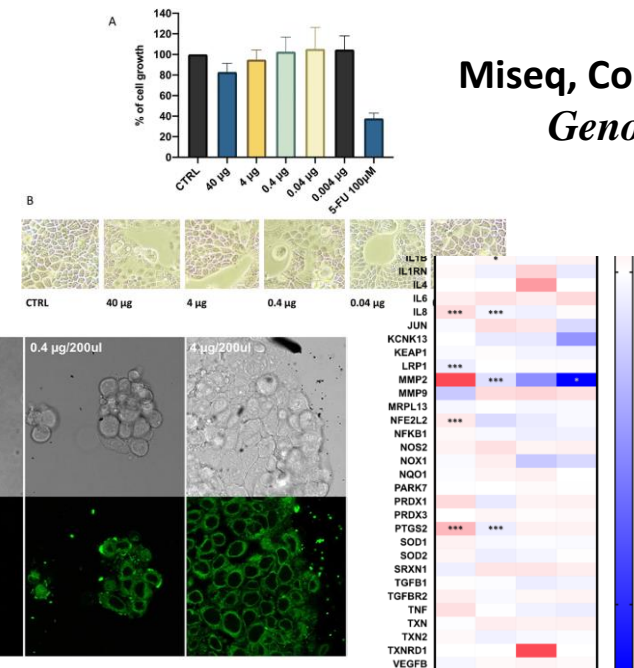
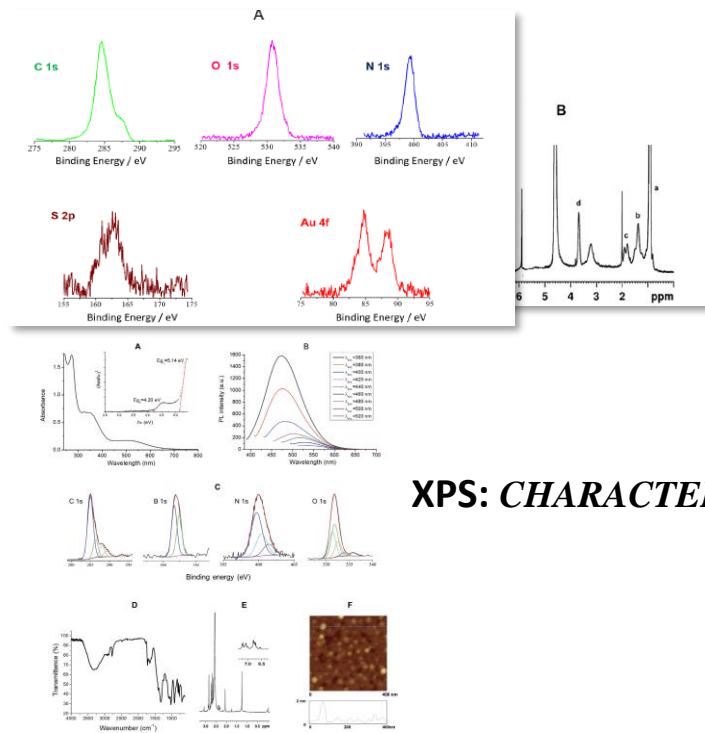
Grazia M. L. Consoli,<sup>1b</sup> ab Ludovica Maugeri,<sup>c</sup> Giuseppe Forte,<sup>1b</sup> c  
Gianpiero Buscarino,<sup>d</sup> Antonino Gulino,<sup>1b</sup> e Luca Lanza<sup>o</sup>,<sup>f</sup> Paolo Bonacci,<sup>g</sup>  
Nicolò Musso<sup>g</sup> and Salvatore Petralia<sup>1b</sup> \*abch

doi.org/10.1002/adhm.202303692

## One-Pot Synthesis of Luminescent and Photothermal Carbon Boron-Nitride Quantum Dots Exhibiting Cell Damage Protective Effects

Grazia M. L. Consoli, Ludovica Maugeri, Nicolò Musso,\* Antonino Gulino, Luisa D'Urso,  
Paolo Bonacci, Gianpiero Buscarino, Giuseppe Forte, and Salvatore Petralia\*

doi: 10.3389/fmolb.2024.1334819



## Miseq, Confocal Microscope Leica TCS SP8 : Genomic and Signaling Platform



Some BRIT scientific output from Nano supported through SAMOTHRACE project:



## Fabrication of novel thin films and monolayers for application as energy conversion layers in photovoltaic devices

Molecular layer deposition to grow a luminescent metalorganic monolayer on inorganic substrate: Breaking monopoly of solution routes to self-assembled monolayer

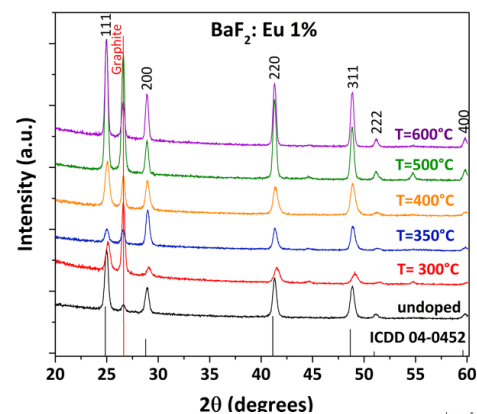
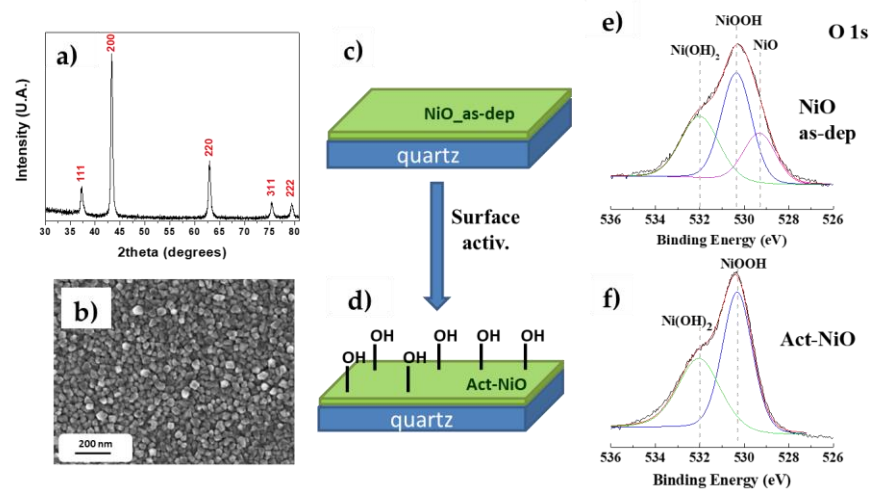
Anna L. Pellegrino<sup>a</sup>, Cristina Tudisco<sup>a</sup>, Francesca Lo Presti<sup>a</sup>, Emil Milan<sup>b</sup>, Adolfo Speghini<sup>b</sup>, Guglielmo G. Condorelli<sup>a</sup>, Graziella Malandrino<sup>a,\*</sup>

<https://doi.org/10.1016/j.nanoen.2023.108804>

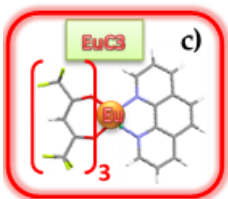
Eu<sup>3+</sup> activated BaF<sub>2</sub> nanostructured thin films: fabrication and a combined experimental and computational study of the energy conversion process†

Francesca Lo Presti,<sup>a</sup> Anna Lucia Pellegrino,<sup>a</sup> Emil Milan,<sup>b</sup> Eros Radicchi,<sup>b</sup> Adolfo Speghini<sup>b,\*</sup> and Graziella Malandrino<sup>a</sup>

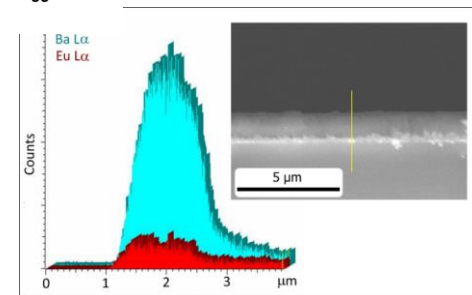
DOI: 10.1039/d3tc02666c



XRD: *CHARACTERIZATION Platform*



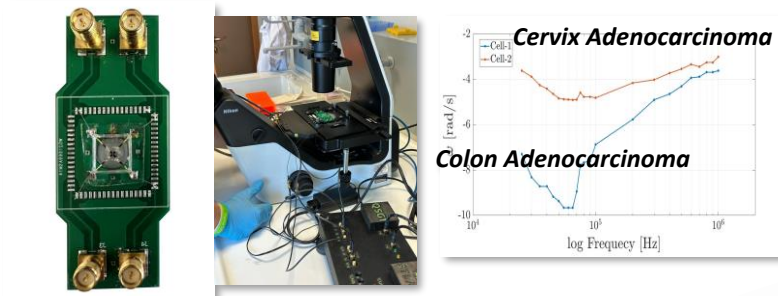
XPS and XRD: *CHARACTERIZATION Platform*



## BRIT & PNRR, Samothrace & InfAct

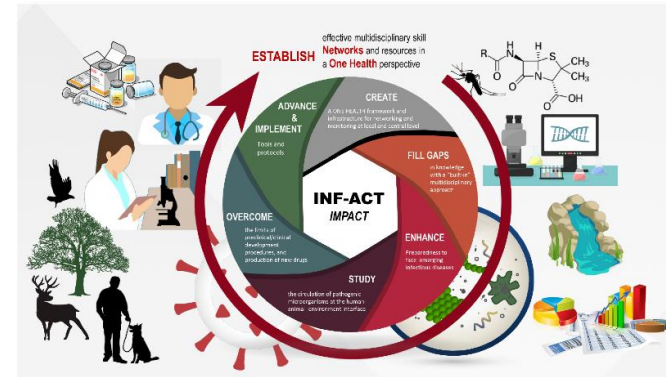


Biochemical Characterization and Biological Effect of DEP Buffers on two different Cancer Cells Line, Buffer on chip test in low and high frequency and infected cells isolation from biological matrix .

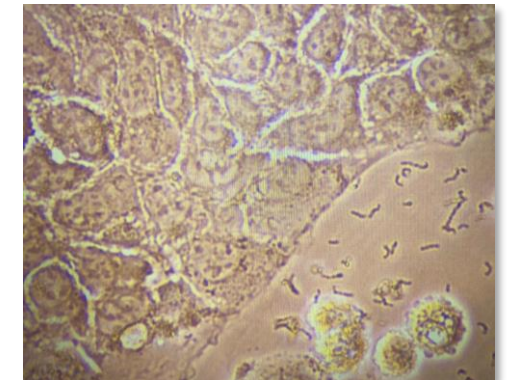
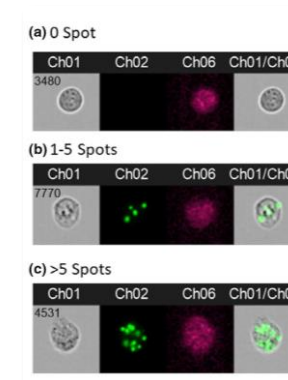
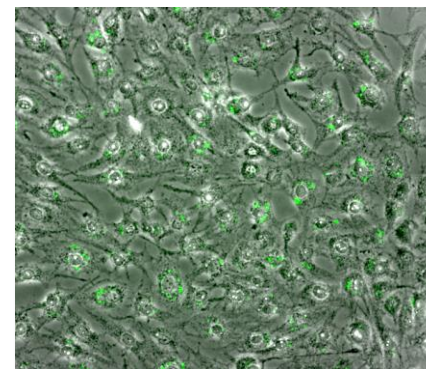


nanocoating production consists of a three steps process:

- 1) Cleaning/activation step
- 2) Self-assembly monolayer reaction formation
- 3) Multicharged nanocoating formation: S01 and S02



Acquisition, expression, diffusion, diagnosis and treatments of MDR microorganisms. The activities range from basic “omic” approaches to preclinical translational models, development of new diagnostics, and innovative systems to treat MDR infections and implementation of novel mathematical models to apply to the precision medicine.







[www.brit.unict.it](http://www.brit.unict.it)