

PARTNER PRESENTATION AND INTEREST IN HORIZON EUROPE PARTICIPATION

Name of the organisation	National Institute for R&D in Microtechnologies, IMT Bucharest
Country	Romania
Type of organisation	Research
Short description	R&D in micro-nanoelectronics, photonics, micro-nano-systems (MEMS, NEMS, MOEMS, RF-MEMS, MNBS), micro and nano-fabrication technologies and new materials
Laboratory	Micro and Nano-Photonics Laboratory
Contact person	Dr. Catalin Pârvulescu
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Short description of Laboratory

Mission: *Research, development and education in micro and nanophotonics*

Research domains:

- **Modelling, simulation and CAD of micro and nano-photonic structures** (optoelectronic devices and photonic integrated circuits; plasmonics; OMEMS).
- **New materials for micro-nanophotonics** (hybrid nano-composites with controlled optical properties, transparent semiconducting oxides, Graphene, quantum dots) **and new processes and devices.**
- **Micro-nano photonics components** (photodetectors, photonic integrated circuits, metasurfaces, plasmonic structures, DOE, optical components);
- **Organic optoelectronics** (devices based on graphene-polymer nanocomposites)

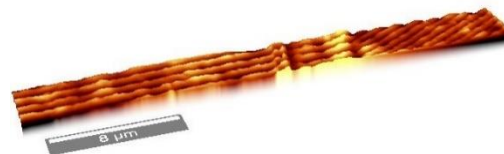
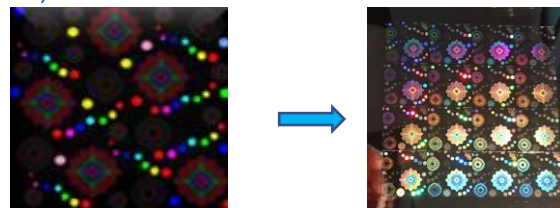
Applications: *Optical sensors; Security elements for anti-counterfeit protection and logistic monitoring (holographic labels with extra security nanoelements, RFID elements and temperature sensor); Free space optical communications; Beam shaping; Quantum technologies.*

Expertise in the specific field of the selected call

- **Development of multilayer smart anti-counterfeit tags** integrating:

1. Classic holographic label;

- Diffractive optical elements specifically designed to obtain customized background for security labels.



2. Security nanoelements (alphanumeric keys, metallic microparticles);

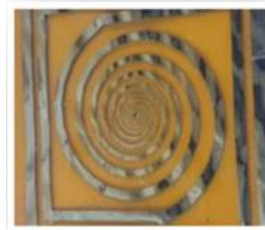
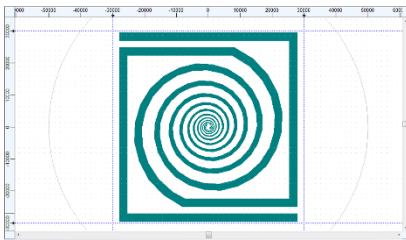
- Alphanumeric security element: location on the classic background known only by designer.





- Metal security microparticles with ***holographic information and alphanumeric code***.
- Can be immersed in paints or integrated in the background of a classic ***anti-counterfeit labels***.

3. RFID elements and temperature sensor



- RFID element (antenna and symmetric attenuation network): integrated with the label helps monitorization of the product on the supply chain.

Involved persons. Short CV

PhD. Catalin Parvulescu Ph.D (2015) in Electronics and Telecommunications. Expertise in *photolithography processes, processing and characterization of photosensitive films, wet etching, nanoimprint lithography processes, bonding processes, microfabrication processes for microfluidics*.

PhD. Dana Cristea (senior researcher) - PhD in Optoelectronics and Material for Electronics from University Politehnica of Bucharest, head of Microphotonics Laboratory; main area of expertise: *micro-and nano-phonic devices, integrated optics, micro-optics, plasmonics, chemo-bio-sensors with optical read-out (design, processing and characterization)*; coordinator of more than 25 national and international projects (FP6, FP7, H 2020) in the area of photonic devices and sensors, coordinator of projects for technology transfer to SMEs.

PhD. Eng. Roxana Tomescu – Master Degree in Optoelectronics (2012) and a PhD in Electronics, Telecommunications and Information Technology (2015) Her main expertise is in: *design and simulations of nano-optics, metasurfaces, plasmonics, nano-antennas*, micro and nano-photonics and optoelectronic devices; *SNOM, AFM and Raman* characterizations; *technological flow* for micro and *nanofabrication*.

Interested in the calls and the ***potential contribution***.

- **HORIZON-CL4-2023-DIGITAL-EMERGING-01-57: Advanced imaging and sensing technologies (IA)(Photonics Partnership)**

Development and realization of new generation smart tags for anti-counterfeit protection and logistic monitoring - ***logistics and quality control of produced goods***;

- **HORIZON-CL4-2023-RESILIENCE-01-33: Smart sensors for the Electronic Appliances market (RIA)**

Holographic labels with extra security nanoelements, RFID elements and temperature sensor for - ***supply chain management***.

Have you already participated in an EU funded project? If so, provide some references/ results.

- **MIMOMEMS**- European Centre of Excellence in Microwave, Millimetre Wave and Optical Devices, based on Micro-Electro-Mechanical Systems for Advanced Communication Systems and Sensors, REGPOT -Contract no. 202897- ***design, fabrication and characterization of plasmonic nanostructures***.
- **FlexPAET**- Flexible Patterning of Complex Micro Structures using Adaptive Embossing Technology, IP, NMP-algorithms for the optimization ***high volume production of large-area masters micro structured surfaces for diffractive optical elements***.
- **WAPITI** -Waferbonding and active passive integration technology and implementation - STREP FP 6 /IST - ***design and 3D simulation of microring resonator, all-optical wavelength converters, multifunctional devices***.