



## PARTNER PRESENTATION AND INTEREST IN HORIZON EUROPE PARTICIPATION

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| <b>Name of the organisation</b>           | <b>National Institute for R&amp;D in Microtechnologies- IMT Bucharest</b>   |
| <b>Country</b>                            | <b>Romania</b>  |
| <b>Type of organisation</b>               | <b>Research Organization</b>  |
| <b>Short description</b>                  | <p><b>IMT-Bucharest (www.imt.ro)</b> is an important actor in Romania and Eastern Europe in its field of activity. The research is oriented to: micro and nanoelectronic devices; micro and nanophotonics; nanotechnologies; advanced materials. At European level, in this moment (2023) IMT runs as partner 6 Horizon Europe Projects and 1 as coordinator. IMT was involved in 11 H2020 projects.</p> <p><b>IMT infrastructure IMT-MINAFAB</b> is a facility for design, simulation, <b>Micro-nanofabrication</b> of electronic devices, sensors and systems, nanotechnologies and Carbon based nanomaterials).</p> <p>IMT_MINAFAB addresses the whole value chain starting with design and simulation to micro-nanofabrication, microphysical characterization and reliability tests, with relevance to ICT, Space, Health, Environment and Energy areas.</p> |
| <b>Laboratory/<br/>Faculty Department</b> | <b>Simulation, Modelling and Computer-Aided Design Laboratory</b>   |
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### Short description of Laboratory involved

The lab is involved in research, development and applications of simulation, modelling and design techniques of micro-electro-mechanical MEMS and microfluidic systems focused to collaborative research projects, education (labs, thesis coordination), services (specific design solutions, models, enabling access to hardware and software tools) and consultancy (design/ optimization) in the field of micro-nanobio/info technologies. Furthermore, the laboratory is developing techniques for rapid prototyping from micro- to macro scale, micro-sensors and MOEMS and MEMS actuators and investigate new classes of advanced materials with applications in nanodevices (thin films and nanostructures of oxide semiconductor materials).

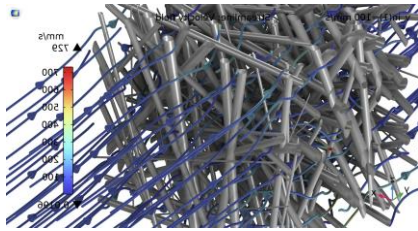
**Main software facilities:** ANSYS Multiphysics 2022 R2., COMSOL M 6.1, COVENTOR 2014, Materialise Magics 26.0; Quantum ESPRESSO, SIESTA, FPLO

**Access to Server:** High Performance Computing cluster consisting of one Windows node with two Intel(R) Xeon(R) E5-2670 v3 processors, 24 cores, 256 GB RAM, and 10 Linux nodes 10 x 2 CPUs Intel(R) Xeon(R) CPU E5-2670 v3, 240 cores, 256 GB RAM/node).

### Expertise:

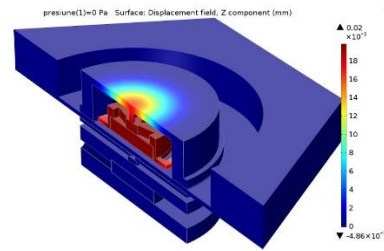
- **Design, simulation and development/ optimization of MEMS/MOEMS** devices and components (cantilevers, membranes, micro-grippers) and **microfluidics** (microchannels, mixers, filters, handling and monitoring systems) for biologic, microelectronics, environmental, security and biomedical applications;
  - **Modelling and simulation for multiphysics phenomena;** mechanical, thermal, electrical, electromagnetic, piezoelectric, **coupled field analysis** (static and transient); **microfluidic analyses: CFD, diffusion, mixing, electrokinetics, fluid-structure interaction, particle dynamics.**
  - **Modeling and simulation of effective material properties for new functional biomaterials such as nanocomposites and fibers:** thermal, mechanical, electrical, filter or barrier homogenized properties of matrix with nanoinclusions and fibrous media.
  - **Rapid prototyping:** 3D Printer (SLS, respectively, a single-photon-absorbed photopolymerization);
- Rapid manufacturing:** 3D Printing (SLS, single-photon-photopolymerization), development of novel additive manufacturing technologies;

- **Design and manufacturing** of MOEMS and MEMS microsystems/actuators and microsensors;
- **Design and microfabrication of microfluidic and micro-electro-fluidic systems, electrical and contact profilometry characterization;**
- **Realization of heterostructures** with (ultra)thin layers by advanced technological processes for devices with controlled functionality.
- **Analysis of the physical phenomena at surfaces and interfaces** in metal-oxide-semiconductor heterostructures. **Modeling** their properties for multifunctional devices.



*Fluid flow through a fibrous material*

COMSOL



*Displacement map of a pressure sensor*

## Involved persons. Short CV

**Dr. Oana Tatiana Nedelcu, Senior Researcher CS I**, Mathematician, PhD in Electronic Engineering, Expertise in Mathematical modeling, multiphysics modeling, design and modeling of nanocomposite materials for homogenized effective properties and physical behavior, MEMS, sensors and microfluidics design, modeling and simulation, electric characterization and electro-fluidic testing. Management experience as Partner Leader for two European projects (FP6, H2020), Project Leader for 10 national projects.

**If you are interested in a particular call, please indicate the Reference of the call/ Topic of interest. Potential contribution.**

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

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

**HORIZON-CL4-2023-RESILIENCE-01-32** Bioinspired and biomimetic materials for sustainable textiles (IA)

**HORIZON-CL4-2023-TWIN-TRANSITION-01-11** Intelligent data acquisition and analysis of materials and products in existing built works (RIA)

**HORIZON-CL4-2023-RESILIENCE-01-34** Advanced (nano and bio-based) materials for sustainable agriculture (RIA)

**HORIZON-CL4-2023-DIGITAL-EMERGING-01-12** Adaptive multi-scale modelling and characterisation suites from lab to production (RIA)

**HORIZON-CL4-2023-DIGITAL-EMERGING-01-33** 2D materials of tomorrow (RIA)

**HORIZON-CL4-2023-DIGITAL-EMERGING-01-11** Low TRL research in micro-electronics and integration technologies for industrial solutions (RIA)

**HORIZON-CL4-2023-DIGITAL-EMERGING-01-32** Sustainable safe-by-design 2D materials technology (RIA)

**HORIZON-CL4-2023-RESILIENCE-01-23** Computational models for the development of safe and sustainable by design chemicals and materials (RIA)

**HORIZON-CL4-2024-RESILIENCE-01-36** Advanced biomaterials for the Health Care (IA)

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

- **H2020: BIONANOPOLYS** -Open Innovation Test Bed for Developing Safe Nano-Enabled Bio-Based Materials and Polymer Bionanocomposites for Multifunctional And New Advanced Applications, Call: H2020-NMBP-TO-IND-2020-two stage, Contract nr. 953206, 2021–2024, **IMT Partner Leader: Dr. Oana Tatiana Nedelcu**
- **FP6 MI Lab-on chip:** Lab-on-a-Chip Implementation of Production Processes for New Molecular Imaging Agents” STREP Contract 516984, 2005- 2008, **Partner Leader: Dr. Oana Tatiana Nedelcu**
- **FP6 INTEGRAMplus:** Multi-domain platforms for integrated micro-nano technology systems SA, FP 6 - IST, Project No. 027540, 2006 – 2008, Team member
- **FP6 PATENT:** Design for Micro & Nano Manufacture, FP6 NoE, 2004- 2008 FP6, Team member
- **FP6 4M:** Multi-Material Micro Manufacture: Technologies and Applications, 2004- 2008, NoE, Team member

## International collaborations - Scientific services contracts:

- **Research Service contract for CEA Saclay, France, March-August 2019, Contact Dr. Oana Tatiana Nedelcu:** Design and fabrication of microfluidic chips, consultancy for experimental set-up for lens-less microscopy