MISSION

Integrating R&D with education and support for industry (services, technology transfer); networking at national and international level, innovation, in the field micro-nano-bio technologies and microsystems (RF- MEMS, photonics devices and circuits, sensors, bio-nano-info technologies, CNT and nanodevices, graphene based sensors and (bio)sensors, integrated nano-bio systems, microfluidics, microactuators).

ORGANIZATION

Department for Scientific and Technological Research

4 centers, grouping 10 R&D laboratories

- MIMOMEMS: European Research Centre of Excellence "Micro- and nano systems for radiofrequency and photonics"
- ► CNT- IMT: Centre of Nanotechnologies" (under the aegis of the Romanian Academy)
- CINTECH: Research Centre for integration of technologies" (micro-nano-biotechnologies)
- ► CENASIC: Research Centre for nanotechnologies and carbon – based nanomaterials

Technological Department

- Clean rooms class 1000, and 10 000
- Mask shop including: pattern generator DWL 66fs Laser Lithography System from Heidelberg Instruments Mikrotechnik GmbH
- EBL: Electron Beam Nanolitography from RAITHnanoenginering work station

IMT- Bucharest is supervised by Ministry of National Education and is acting autonomously, like a scientific company having the status of a public institution.

MAIN RESEARCH TOPICS

- ▶ RF-MEMS devices and circuits: design, modelling and manufacturing of dielectric membrane supported inductors, capacitors, filters and antennae based on silicon and GaAs micromachining; micromachined millimetre and sub millimetre wave receiver modules, SAW interdigitated traducers; nanoelectronic devices
- ▶ Photonic devices and MOEMS (waveguides, optical couplers, µring filters and resonators; grating-based microstructures, tuneable interferometers based on movable micromirrors, optical sensors), photonic circuits for optical interconnections
- MEMS based microsensors and actuators for biomedical, environmental applications and robotics: pressure sensors, accelerometers, microgrippers

The research laboratories of IMT-Bucharest are also developing:

- ► CNT and graphene based micro-nanostructures for sensing and interconnections
- **► microfluidic** devices
- biochips for biological materials investigation and detection (proteins, DNA, enzymes) on various substrates (silicon, glass, polymers), microarrays, biosensors
- ▶ silicon nanoelectrode arrays, porous silicon layers (El, bio-active properties); field emission and nanostructures;
- magnetic nanostructures



National Institute for R&D in Microtechnologies



Main targeted applications:

communications, biomedical, health, environment, energy, automotive, robotics, space applications.

Training activities: master courses, internships, hands-on labs for students, PhD supervising and post-doc programs.

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MAIN FACILITIES MAIN FACILITIES MAIN FACILITIES

- A class 1000 clean room (220 sqm) for the mask **shop** and the most demanding technological processes (in use since September 2008);
- A class 100,000 clean room, the so called "Grey Area" (200 sgm), mostly for the characterization equipments (in use since September 2008);
- A class 10,000 clean room (105 sgm) for thin layer deposition by CVD techniques: LPCVD, PECVD; DRIE; RTP etc. (totally in use since early 2012);



Photolithography (chrome, maskless, wafer double-side alignment exposure)

Pattern generator - DWL 66fs Laser **Lithography System** (Heidelberg Instruments Mikrotechnik, Germany) **Double Side Mask Aligner** - MA6/BA6 (Suss MicroTec, Germany)

Nanolithography (EBL, EBID, EBIE, Dip-pen) and SEM

Electron Beam Lithography and nanoengineering workstation - e_Line (Raith, Germany) Dip Pen Nanolithography - NSCRIPTOR (Nanolnk, Inc., USA)

Field Emission Gun Scanning Electron Microscope (FEG-SEM) - Nova NanoSEM 630 (FEI Company, USA)

Physical depositions of materials in high-vacuum

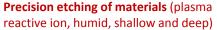
Electron Beam Evaporation - TEMESCAL FC-2000

(Temescal, USA)

Electron Beam Evaporation and DC sputtering system-AUTO 500 (BOC Edwards, UK)

Chemical depositions, thermal processing

PECVD - LPX-CVD, with LDS module (SPTS, UK) **LPCVD - LC100** (AnnealSys, France) Rapid thermal processing/annealing - AS-One (AnnealSys, France)



DRIE- Plasmalab System 100- ICP Deep Reactive Ion Etching System (Oxford Instruments, UK)

RIE Plasma Etcher - Etchlab 200 (SENTECH Instruments, Germany)

X-Ray diffractometry

X-ray Diffraction System (triple axis rotating anode) - SmartLab - 9kW rotating anode, in-plane arm (Rigaku Corporation, Japan)



Scanning Probe Microscope - NTEGRA Aura (NT-MDT Co., Russia)

Scanning Near-field Optical Microscope Witec alpha 300S (Witec, Germany)



Nanomechanical characterization

Nanomechanical Characterization equipment - Nano Indenter G200 - (Agilent Technologies, USA)

Microarray spotting/scanning

Micro-Nano Plotter - OmniGrid (Genomic Solutions Ltd., UK)

Microarray Scanner - GeneTAC UC4 (Genomic Solutions Ltd., UK)

Analytical characterization tools

Scanning Electrochemical Microscope ElProScan (HEKA, Germany)

Zeta Potential and Submicron Particle Size Analyzer

- DelsaNano (Beckman Coulter, USA)

Fluorescence Spectrometer - FLS920P (Edinburgh Instruments, UK)



Interferometry/profilometry; Spectroscopy

High Resolution Raman Spectrometer - LabRAM HR 800 (HORIBA Jobin Yvon, Japan)

White Light Interferometer - Photomap 3D (FOGALE nanotech, France)

Electrochemical Impedance Spectrometer -

PARSTAT 2273 (Princeton Applied Research, USA) Fourier-Transform Infrared Spectrometer - Tensor 27 (Bruker Optics, Germany)

UV-Vis-NIR Thermo-Electric Cooled Fiber Optic Spectrometer - AvaSpec-2048 TEC (Avantes, The Netherlands)

Refractometer for layer thickness measurements -NanoCalc-XR (Oceanoptics, USA)



Probers, on-wafer; electrical characterization

(Keithley Instruments, USA)

Semiconductor Characterization System (DC) with Wafer Probing Station - 4200-SCS/C/Keithley Easyprobe EP6/ Suss MicroTec (Keithley Instruments, USA; Suss MicroTec, Germany Semiconductor Characterization System - 4200-SCS, C-V 3532-50, DMM 2700-7700, 2002, 6211-2182

Microwave network analyzer (0.1-110GHz) with Manual Probing Station (Anritsu, Japan; Suss MicroTec, Germany)

Frequency Synthesizer up to 110 GHz (Agilent, USA) Spectrum Analyzer up to 110 GHz (Anritsu, Japan)

