

# €5.9M European initiative to provide platform for electro-thermal characterisation of More-than-Moore and Beyond CMOS devices



Multidomain pLAtform for iNtegrated MOre-tHan-MoorE/Beyond CMOS systems charACterisation & diagnosTics

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**Financed by (funding body, program, call):** FP7 ICT-2011.3.1 Very advanced nanoelectronic components: design, engineering, technology and manufacturability

**Starting/ending:** 1.10.2012 – 30.09.2015

**Project partners:**

- Instytut Technologii Elektronowej, PL (coordinator)
- Fraunhofer Institute, DE
- Technische Universitaet Ilmenau, DE
- Politechnika Wroclawska, PL
- IBM Research GmbH, CH
- Imina Technologies SA, CH
- Ecole Polytechnique Federale de Lausanne, CH
- Universite de Franche-Comte, FR
- Carl Zeiss SMS GmbH, DE

A three-year project funded by the European Commission, aimed at providing integrated platform for multidimensional nanoprobng and advanced thermal analysis at the nanoscale has been launched. NANOHEAT, Framework 7 STREP (Specific Targeted Research Projects), coordinated by the Institute of Electron Technology (Warsaw, Poland) is based on complementary expertise and facilities of nine partners from four different European countries.

The main idea behind the project was the observation that progress of micro- and nano-electronic component technology is directly related to even more remarkable progress of tools for advanced processes, process control and new material development. This progress must be supported by adequate development of tools for process/device monitoring and characterization. It is important to note that there is extensive shortage of versatile, multi-domain tools capable of analysing phenomena occurring at the nanoscale, which are critical for supporting progress towards advanced nano-devices, systems and systems of systems,

integrating nano-structures, widely understood Beyond-CMOS (sub-40nm transistors, SETs, spintronics, molecular or graphene structures etc.) and More-than-Moore components.

Dr. Pawel Janus, NANOHEAT leader, said: *“The family of AFM-based techniques provides various nanoscale observation capabilities restricted however to specific phenomena. Moreover, currently available AFM systems do not allow for easy “domain-mixing”, nor for combination of large distance and nanoscale positioning precision. These techniques are not useful as an in-line monitoring/diagnostic tool. Therefore, there is a need for new techniques allowing for wafer-level, interoperation control”.*

The principle goal of the NANOHEAT is to develop, deliver and test a miniaturized and integrated platform which provides a multidimensional nanoprobng capabilities for advanced thermal analysis at the nanoscale. The multi-functional system of independently controlled AFM-based (Atomic Force Microscopy) nanoprobes, equipped with dedicated (Focus Ion Beam functionalized) tips and nanomanipulators will allow for multi-domain diagnostics of nanoelectronic, nanophotonic and bio-electronic devices. The proposed system will allow thermal, electrical (e.g. potential) or even chemical (e.g. electrochemical) properties at the nanoscale to be observed. It will also have in-line (wafer-level) diagnostics capabilities.

An important strength of the NANOHEAT project is its consortium structure. It comprises groups and laboratories with leading competences in AFM-related field (Fraunhofer Institute, Wroclaw University or IBM-Zurich – the laboratory where Scanning Tunneling Microscope invention was awarded with Nobel Prize in 1982).



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