

# ELECTRICAL, ELECTRONICS AND COMMUNICATIONS ENGINEERING

## FBK/DET - MEMS-based MOS gas sensors for environmental monitoring: from multiscale and functional simulations to fabrication and tests

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<b>Context of the research activity</b>	The topic of this PhD project, titled "MEMS-based MOS Gas Sensors for Environmental Monitoring: From Multiscale and Functional Simulations to Fabrication and Tests," has a dual focus on environmental sustainability and digital innovation. The goal is to develop advanced microelectronic sensors that, in the future, will contribute to the monitoring and control of air pollution and the analysis of air quality.
<b>Objectives</b>	<p>The research activity involves the use of multiscale and functional simulations, as well as fabrication and testing activities. The adoption of MEMS technologies and MOS sensors represents a significant contribution to innovation in the field of environmental sensing, promoting the development of advanced solutions and the creation of technological know-how in this specific sector.</p> <p>The central goal of the research is to optimize the fabrication process of sensors based on metal oxide nanowires using a planar process. To this end, simulation models will be developed at the level of the fabrication process, enabling optimal calibration of the sensor's manufacturing stages.</p> <p>In parallel with the fabrication process simulation, the sensors will be electrically characterized by correlating experimental measurements of the fabricated structures with the results obtained through electrical simulation.</p>
<b>Skills and competencies for the development of the activity</b>	<p>In-depth knowledge of the main planar fabrication processes.</p> <p>In-depth knowledge of the main simulation tools for fabrication processes.</p> <p>In-depth knowledge of simulation and electrical modeling techniques for solid-state structures.</p> <p>Knowledge of the operating principles of sensors based on metal oxides.</p> <p>Knowledge of transport principles in nanowires.</p>

