

# Engineering light-matter interactions with 2D materials at the nanometer level via substrate patterning

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## About the Project

This research activity will be focused on creating new nanophotonic devices based on 2D materials including (but not limited to) graphene, boron nitride and transition metal dichalcogenides. The goal is to enhance and control at the nanoscale the interaction between light and these materials for bio-chemical sensing and optoelectronics applications. This will be achieved using a new nanofabrication technique to create a patterned substrate with features of less than five nanometers and then transferring 2D materials on top of this substrate. The candidate will be working on the fabrication of these new devices in the cleanroom facilities at the Italian Institute of Technology and on their characterization with multiple techniques including optical and electrical measurements, electron microscopy and atomic force microscopy. While an important focus of the project is the nanofabrication of these devices in cleanroom, the research activity will be interdisciplinary and include the numerical modelling of the observed phenomena. In addition to significantly advancing the state of the art of nanophotonics, this project will offer to the candidate an excellent opportunity to learn advanced cleanroom nanofabrication skills and materials characterization techniques and acquire cutting-edge knowledge in multiple technical disciplines. She/he is expected to work independently but in strong collaborations with other researchers.

Requirements: The successful candidate should have a degree in materials science, engineering or physics, with a strong interest in cleanroom, micro-nano fabrication, nanomaterials, experimental optics and optoelectronics. Work experience within a micro/nano-fabrication facility will be positively considered. A working knowledge of Matlab or Python programming is desirable.

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