# Demonstration of different portable nanosensing platforms with optical and electrochemical readout

**Ruslán Alvarez-Diduk**[1]
Amadeo Sena-Torralba[1], José Francisco Bergua[1], Caterina Giacomelli[1], Abdulhadee Yakoh[1], Claudio Parolo[1], Andrea Idili[1], Jahir Orozco[1], Arben Merkoçi[1,2]

[1] *Nanobioelectronics & Biosensors Group, Institut Català de Nanociència I Nanotecnologia (ICN2), CSIC and The Barcelona Institute of Science and Technology (BIST), Campus UAB, 08193, Bellaterra, Barcelona, Spain.*
[2] Catalan Institution for Research and Advanced Studies (ICREA), Pg. Lluís Companys 23, 08010 Barcelona, Spain
arben.merkoci@icn2.cat

Inexpensive, fast and easy-to-use point-of-care detection systems are in demand for application in different fields. We will demonstrate that graphene and other nanomaterials can be used in combination with a smartphone to develop this kind of devices. Different sensing platforms will be shown; for example, a screening device with a smartphone readout, a screen-printed electroluminescent lamp modified with graphene oxide, a paper-based electrophoretic bioassay, a portable ELISA plate reader and a new method of transferring laser-scribed conductive rGO films onto almost any substrate.

## References

[1] Álvarez-Diduk, R., Orozco, J., & Merkoçi, A. (2017). Paper strip-embedded graphene quantum dots: a screening device with a smartphone readout. Scientific reports, 7(1), 1-9
[2] Yakoh, A., Álvarez-Diduk, R., Chailapakul, O., & Merkoçi, A. (2018). Screen-printed electroluminescent lamp modified with graphene oxide as a sensing device. *ACS applied materials & interfaces*, *10*(24), 20775-20782.
[3] Giacomelli, C., Álvarez-Diduk, R., Testolin, A., & Merkoçi, A. (2020). Selective stamping of laser scribed rGO nanofilms: from sensing to multiple applications. *2D Materials*, *7*(2), 024006.
[4] Sena-Torralba, A., Alvarez-Diduk, R., Parolo, C., Torné-Morató, H., Müller, A., & Merkoçi, A. (2021). Paper-Based Electrophoretic Bioassay: Biosensing in Whole Blood Operating via Smartphone. *Analytical Chemistry*, *93*(6), 3112-3121.

We acknowledge EU Graphene Flagship project funding under grant agreement No 881603.

## Figures