# Label-free electronic (bio) sensing using graphene

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Nanoelectronic devices as on-chip (bio)sensors motivate the vision of portable and compact analysis systems for the direct detection of trace amounts of analytes and biomarkers at the point-of-use or point-of-care. In order that such sensors find an application, many challenges need to be overcome. In this context, we explore strategies to engineer the surface chemistry of individual graphene sheets and to obtain a better understanding and control of the physico-chemical properties of the nanostructure-liquid-interface. We have designed an electrochemical route for controlled surface functionalization of nano objects and analytical protocols that allow a stable and reliable electronic readout of the various phenomena occurring at the graphene-liquid-interface. The designed sensors enable the real-time measurement of the kinetics of biomolecular interactions, specifically the interaction of enzymes with immobilized substrate molecules.