Graphene has unique properties, such as high carrier mobility and constant optical absorption from visible to IR. When these are combined with the ease of Fermi level tuning by chemical doping or electrical gating, they open up great opportunities in electronics, optoelectronics and sensing\textsuperscript{1}. There are still, however, limitations that need to be overcome. For example, the lack of strong conductance modulation in graphene due to Klein tunnelling, or the poor light absorption of 2.3\%, which while a remarkably high percentage for a one atom thick material, is relatively low in terms of practical applications. In this talk we will review the main electronic and optical properties of graphene, and discuss different design approaches to alleviate the aforementioned drawbacks, such as the combined use of electric and magnetic barrier arrays for increasing the conductance modulation depth, or the use of plasmonics and interference effects to increase the Vis-IR absorption, targeting applications in graphene-based sensing and photodetection. [This work was funded by the EU Graphene Flagship, contract no.604391]

\textsuperscript{1}A.C. Ferrari et al., Science and technology roadmap for graphene, related two-dimensional crystals, and hybrid systems, Nanoscale 7, 4598-4810 (2015).