A fresh look on carbon-based materials like carbon nanotubes (CNT) or graphene in microelectronic applications will be given. Graphene has just passed the peak of inflated expectations and is heading towards the trough of disillusionment from where CNTs are just recovering. In contrast to short scale SWCNTs, graphene nanoribbons - even with bandgap – are not promising candidates for a better transistor. However, interconnects made of multi-layer graphene show promise in a wide range of applications. Through-Silicon-Vias (TSV), capacitors, carbon gate, diodes, memories and sensors will be discussed. These applications are heavily based on the direct deposition methods which we have developed over the past decade.