

Crystalline graphene multilayers present a rich playground to explore correlated electronic phenomena in a tunable and ultra-clean setting. For instance, Bernal bilayer graphene and rhombohedral trilayer graphene host multiple symmetry-broken metallic phases at low temperature, as well as unconventional superconductors with different pairing symmetries. The rich phase diagram of these systems can further be tuned through proximity to  $WSe_2$ , which induces spin-orbit coupling in the graphene layers and leads to a dramatic enhancement of superconductivity that remains poorly understood. I will first discuss the lessons learned from our theoretical exploration of graphene multilayers with induced spin-orbit coupling, focusing on various types of magnetic and inter-valley coherent ground states and their possible connections to superconductivity. I will then outline a recipe to engineer topological superconductivity in graphene multilayers using gate-defined Josephson junctions. Such a platform provides a promising alternative to traditional architectures for Majorana zero-modes due to its purity, gate tunability and atomically thin nature.