Over the past 15 years, the class of two dimensional materials has emerged as a new playground to realize quantum phenomena. This class of materials began with graphene, but has quickly blossomed to include two dimensional semiconductors, insulators, topological insulators, superconductors and magnets. Individual atomic layers of these materials can now be assembled nearly at will into unique multilayer structures by the simple process of “putting things on top of other things”.

In this talk, I will review some of the recent developments in this field that now allow us to realize many unique electronic structures using basic building blocks that are individual atomic sheets, and the new quantum phases that emerge in these structures. I will also discuss the many exciting but unrealized possibilities for the future in this materials class.

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