Non-covalent directional intermolecular interactions provide a pre-determined recognition pathway which has been widely exploited in supramolecular chemistry to form functional nanostructures in both solution and in the solid-state. Our studies using hydrogen-bonding interactions to enable the directed assembly of extended nanostructures will be presented and in particular the lecture will focus on our work investigating surface-based self-assembly processes. The talk will include studies that demonstrate unprecedented control of supramolecular topology (Fig. i) [1] the first direct observation of a molecular-scale glass (Fig. ii) [2] and the generation of a new class of porphyrin molecular tiles that are functionalised with DNA bases. Recent developments in scanning probe microscopy allow direct visualisation of sub-molecular features (Fig. iii).[3] Most importantly our work establishes a direct connection between crystal engineering, supramolecular chemistry and nanostructure fabrication.


Keywords: Crystal Engineering, 2D Crystals, Supramolecular