Extending 2D structures into 3D space has become a general trend in multiple disciplines, including electronics, photonics, plasmonics and magnetics. This approach provides means to modify conventional or to launch novel functionalities by tailoring curvature and 3D shape. We study 3D curved magnetic thin films and nanowires where new fundamental effects emerge from the interplay of the geometry of an object and topology of a magnetic sub-system [1,2]. On the other hand, we explore the application potential of these 3D magnetic architectures for the realization of mechanically shapeable magnetoelectronics [3] for automotive but also virtual and augmented reality appliances [4,5]. The balance between the fundamental and applied inputs stimulates even further the development of new theoretical methods and novel fabrication/characterization techniques [6-8].