This Part includes nanoscale interconnect processing technologies and self-assembly of short aromatic peptides. Chapter 34 “Emerging Nanoscale Interconnect Processing Technologies: Fundamental and Practice” begins with a brief review of current copper-based interconnect technologies, with focus on the role of conventional electroplating techniques as enabler in the reliable and reproducible fabrication of the nanoscale copper wiring architectures necessary to ensure continuation of the historical rate of progress of the semiconductor industry. This review is followed by a discussion of future nanoscale interconnect technologies, including hyper-integration circuitry (HIC), spintronics, moletronics (including carbon nanotubes), and nano-bio interconnects. Particular emphasis is placed on the implications of these technologies on interconnect fabrication processes, particularly in terms of the emergence of “molecular plating” processes that make use of protocols such as self-assembly, atomic manipulation, and precise management of localized material properties to fabricate the new wiring paradigms needed. In the Chapter 35 “Self-Assembly of Short Aromatic Peptides: From Amyloid Fibril Formation to Nanotechnology,” the use of small aromatic peptides as building blocks for the assembly of highly ordered nano-scale structures is being described. These building blocks are derived from recognition modules that mediate the self-assembly of biological amyloid nano-fibrils. We explain the theoretical background that led to the identification of these building blocks and illustrate their technological applications. The author’s studies on the mechanism of protein self-assembly into ordered amyloid assemblies had provided important information on the mechanism by which simple biological elements interact and identified new building blocks for nanotechnology. The gained information will lead to a better understanding of the potential use of peptide nanotubes in future applications, such as micro and nano-electromechanics (MEMS and NEMS, respectively) and for medical devices.