Abstract: With the increasing computing power of multi-core chips, the challenge of the embedded system development is now on how to jointly management heterogeneous resources, such as computing cores and various memory devices, to explore the energy saving, performance improvement, and fast booting. Heterogeneous hardware is widely adopted in computer designs to pursue specific functions, low costs, and high throughputs. The heterogeneous memory allocation is proven to have a great impact on the system performance, and the heterogeneous computing unit management is still a challenging issue in this research area. In this talk, the concept of real-time embedded systems is going to be introduced, and some important topics of embedded systems will be presented. When the fast local memory and the global memory are considered, a management scheme is developed to optimize the system runtime performance. When non-volatile memory is further included, a memory partition and task scheduling algorithm is proposed to minimize the system booting time and application initialization time. This talk will be concluded by providing some observations and insights into the embedded system research.