With the recent advent of mobile computing devices such as PDAs, cellular phones, sensors, and smart cards, data management on such devices has become an important research area. Interestingly, very small data bases are just as challenging to manage as very large data bases, because the traditional large database systems designed to manipulate terabytes of storage on multiprocessor engines are not appropriate for small devices. The difference lies in three major factors: First, resources in tiny devices are typically scarse, therefore designers of embedded database systems must minimize footprint, memory references, CPU cycles, network bandwidth, and more importantly, consumption of battery power. Second, mobility makes cache consistency a much more challenging problem than it is in traditional distributed client/server systems. Third, the software needs to be robust and, once installed, should function without needs for administration.

This special edition of the IEEE Data engineering Bulletin is devoted to Embedded and Mobile Database Systems, and includes a representative collection of articles which describe efforts to address important problems in the field. The issue opens with Anil Nori's survey of the problems and current efforts in the area, followed by a more detailed study on caching and replication for mobile databases by Panos Chrysanthis and Evi Pitoura. The challenges of embeddability and their solutions are detailed in the next three articles: Margo Seltzer contributed an article on the ubiquitous BerkeleyDB, now part of Oracle, but traditionally part of numerous research projects as a versatile embedded database system. An article on the SQL Anywhere server by Sybase iAnywhere follows, which explains the main design challenges and ideas of this popular embedded commercial product. In addition, the inspirers of TinyDB – the must-have to successfully and reliably collect and query data on dynamic, ever-growing sensor networks – sent us an article describing the main aspects of the system and related reserch efforts by the same group. The issue concludes with an article by Anciaux et. al. at INRIA, which explains the challenges and trends when managing data on secure chips, such as smart cards.

I would like to cordially thank the authors of the articles above, who graciously devoted their time and effort to contribute articles to this special edition. I hope that you will enjoy reading it.