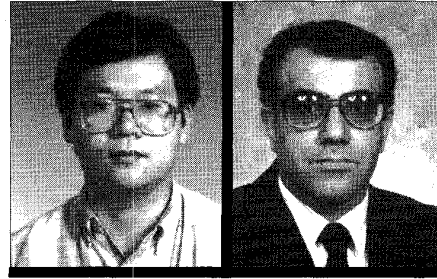


## PCS Network Management



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Since the development of AMPS in late 1960, mobile network technologies have evolved from the first-generation analog systems to the second-generation digital systems. Since late 1990, significant effort has been devoted to the research and development of third-generation personal communications services (PCS) systems. Two major characteristics distinguish third-generation systems from second-generation systems:

- **Capacity:** In second-generation systems narrowband radio systems were considered, which are designed for voice applications. On the other hand, wideband radio systems are investigated for third-generation mobile networks to offer high bandwidth (e.g., 2 Mb/s) for data applications.
- **Interoperability:** Instead of focusing on one single standard, a family of standards will be defined for third-generation systems. Thus, system integration and network interoperability will be major tasks in third-generation systems.

The main theme of this Special Issue is PCS network management, which is devoted to management aspects of PCS data application and network management platforms that may evolve PCS from the second toward the third generation. The Special Issue consists of five articles. In the first article, Ryu *et al.* develop a system and network architecture to provide IP services in a low-tier system called Personal Access Communications Services (PACS). The article shows how to incorporate mobile IP protocol into the PACS handoff mechanism to further achieve global IP mobility. Several features are developed to seamlessly integrate PACS into the global Internet and provide standard-conforming IP services with global mobility.

In the second article, Faggion and Hua address the issues of integrating PCS systems with the fixed networks under the intelligent network (IN) concept. The article demonstrates the interworking capabilities of IN to integrate PCS systems (such as GSM) into the public switched telephone network (PSTN) on a general network management platform.

In the third article, Kaloxylos *et al.* describe how to integrate an ATM backbone network with radio systems to support third-generation PCS networks. In the wireless ATM architecture the article proposes a mobility management and control framework, and describes implementations for handoff and registration procedures.

In the fourth article, Daoud investigates the network management issues for universal broadband mobile telecommunications systems (UBMTS). Based on Telecommunications Information Networking Architecture (TINA) infrastructure, the article

shows convergence of telecommunication and data communication networks based on the communications middleware concept, which will provide universal connectivity between mobile users and their applications. In the last article, Akyildiz *et al.* offer an overview on PCS mobility management. This article describes location management for existing cellular systems, and the architecture of a future integrated wireless network. The cell-based frequency reuse scheme is considered in this complex scenario; global roaming and frequency spectrum planning are addressed. The core of the article is devoted to a survey on the state of the art of technology, standards, and research in the areas of mobility management in the PLMN backbone, IP networks, ATM networks, and satellite networks.

We would like to express our sincere thanks to all the authors who submitted papers, and the reviewers who provided constructive reports for this Special Issue. Also, we would like to thank John Daigle, the Editor-in-Chief, for his support in editing this Special Issue.

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### Biographies

YI-BING LIN [SM] (liny@csie.nctu.edu.tw) received his B.S.E.E. degree from National Cheng Kung University in 1983, and his Ph.D. degree in computer science from the University of Washington in 1990. From 1990 to 1995 he was with the Applied Research Area at Bellcore, Morristown, New Jersey. In 1995 he was appointed professor of the Department of Computer Science and Information Engineering (CSIE), National Chiao Tung University (NCTU). In 1996 he was appointed deputy director of the Microelectronics and Information Systems Research Center, NCTU. Since 1997, he has been elected chair of CSIE, NCTU. His current research interests include design and analysis of personal communications services network, mobile computing, distributed simulation, and performance modeling.

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