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Multiple Access Communications

Third International Workshop, MACOM 2010
Barcelona, Spain, September 13-14, 2010
Proceedings

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Preface

It is our great pleasure to present the proceedings of the Third International Workshop on Multiple Access Communications (MACOM) that was held in Barcelona during September 13–14, 2010.

In 1961, Claude Shannon established the foundation for the discipline now known as “multi-user information theory” in his pioneering paper “Two-way Communication Channels,” and later Norman Abramson published his paper “The Aloha System—Another Alternative for Computer Communications” in 1970 which introduced the concept of multiple access using a shared common channel. Thereafter, for more than 40 years of study, numerous elegant theories and algorithms have been developed for multiple-access communications.

During the 1980s and 1990s the evolution of multiple-access techniques proceeded in conjunction with the evolution of wireless networks. Novel multiple access techniques like code division multiple access (CDMA) and orthogonal frequency division multiple access (OFDMA) provided increased spectral efficiency, dynamicity and flexibility in radio resource allocation with intrinsic anti-multipath and anti-interference features. In this first decade of the 21st century, multiple-access techniques, derived from advanced wireless transmission methodologies based on the diversity concept (e.g., MC-CDMA, MIMO-OFDMA and SC-FDMA), opened the road to a renewed idea of multiple access. Today multiple-access communications involve many challenging aspects not only limited (like in the past) to physical layer design. Medium access control (MAC) techniques play a crucial role in managing the radio resources that users will exploit to transmit their data streams. Recent developments in software radios and cognitive radios have led to a significant impact also on spectrum management and access paradigms. Old paradigms of multiple-access management were based on locked and exclusive reservation policies of spectrum resources. Cognitive radios allow us to sense the spectrum and to occupy free bandwidth portions following opportunistic approaches.

Technical contributions to all these topics were presented and discussed in MACOM 2010 and are included in this book. We received more than 50 submissions for the conference, including 10 invited papers. After the review process, 21 high-quality full papers were accepted for presentation at the workshop, together with 6 posters. Almost every submission received at least three reviews from the members of the Technical Program Committee and/or external reviewers. Our gratitude goes to the Technical Program Committee and external reviewers for their efforts.

MACOM 2010 also included four distinguished keynote speakers: Dimitry Osipov, Alexander N. Dudin, David Malone and, especially for his relevance in the history of multiple-access communications, Norman Abramson. Additionally, a special session devoted to the IC0906 COST action WINEMO (Wireless

Networking for Moving Objects) was planned to promote interactions and further discussions with researchers from all European countries working in these fields.

Finally, we would like to take this opportunity to express our gratitude to the sponsors and supporters, together with the local organizers, who help to make MACOM 2010 a very successful event.

September 2010

A. Vinel
B. Bellalta
C. Sacchi
A. Lyakhov
M. Telek
M. Oliver

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