

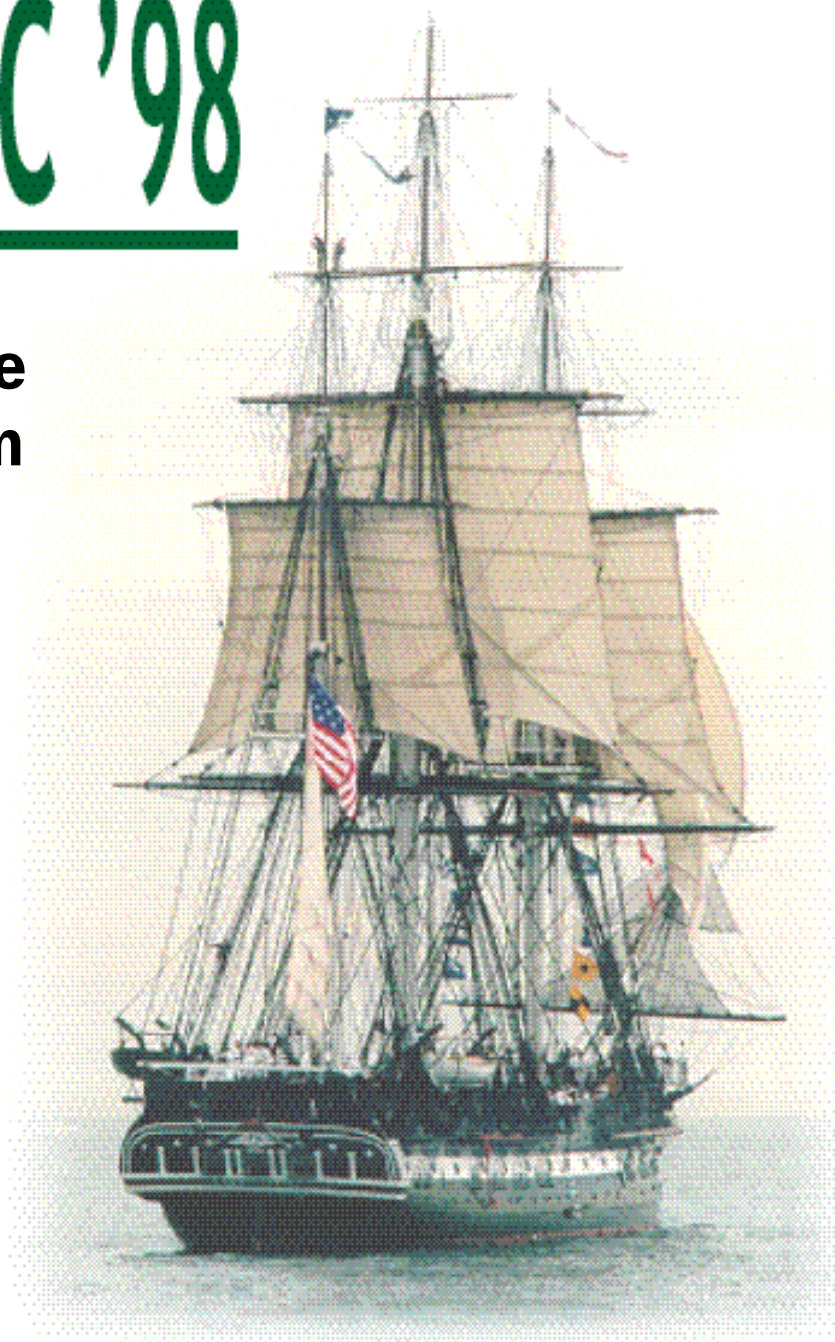
The Ninth IEEE International Symposium on

Personal, Indoor and Mobile Radio Communications



PIMRC '98

**Advance
Program**



Marriott Copley Place • Boston, Massachusetts, USA • September 8-11, 1998



Table of Contents

Greetings from the Governor of Massachusetts.....	2
Greetings from the Mayor of Boston	2
Greetings from the General Chairman	3
Greetings from the Organizer and Technical Program Chairman	3
Organizing and Technical Program Committees	5
Program Schedule Overview	6
Invited Papers	8
Tutorials	9
Panels.....	14
Exhibits.....	14
Conference Arrangements.....	15
Conference Hotel	16
Hotel Reservation Request Form	17
Social Events.....	18
Registration Form	19
Technical Session Overview — Wednesday, September 9	21
Technical Session Overview — Thursday, September 10	24
Technical Session Overview — Friday, September 11	28



Greetings from the Governor of Massachusetts



I am pleased to extend warm greetings as you gather for the Ninth IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC '98), to be held in Boston, Massachusetts, on September 8–11, 1998.

This year's conference is expected to draw more than six hundred researchers from academia, industry, and government; senior executives

of telecommunications companies; managers; and engineers from more than 40 different countries. I applaud the outstanding efforts of the participants, who share an uncompromising commitment to excellence, and commend the dedication of the members of IEEE who make this event possible.

Best wishes for an exciting and enjoyable event.

Argeo Paul Cellucci
Governor of Massachusetts

Greetings from the Mayor of Boston



I send you my sincerest welcome as you gather from around the world for the Ninth IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC '98).

You picked the perfect city. Boston's many universities and growing technology sector make us a world leader in the field. This symposium represents an important opportunity for professional development and the exchange of information in an important field of communications technology.

Boston is also renowned for our historic and charming neighborhoods, our inviting parks and waterfront walkways, and our wide selection of eateries—from four-star restaurants to cozy corner pubs. I invite you to explore our city—so friendly to pedestrians it's known as "America's Walking City"—and uncover some of its many treasures.

You have my wishes for a very successful and productive symposium and, again, I welcome you to Boston. I send you my best regards.

Thomas M. Menino
Mayor of Boston



Greetings from the General Chairman



It is my honor and pleasure to welcome you to Boston for the Ninth IEEE International Symposium on Personal, Indoor and Mobile Radio Communications.

It is appropriate that your symposium is in the United States this year. It follows a year which witnessed an explosion of competition in wireless communications. The United States now has over 56 million wireless communications customers who can choose from up to eight providers of wireless services in their market. Right here in Boston there are six companies from

which customers can choose to purchase their wireless service. This unprecedented level of wireless competition is prompting technical and marketing innovation. The wireless providers in Boston, for instance, are using a variety of technologies to deliver services to customers. Customers can choose from service offerings that use CDMA-800, CDMA-1900, TDMA, ETDMA, GSM, and analog.

Customers know that competition has arrived, and they recognize that new features, lower costs per minute, and cheaper phones will soon follow. Customers have told us that they want calling party pays, location technology services, wireless data, wireless local loop, and bundled services.

Our greatest challenge is to understand exactly what customers want in order to make the right technology decisions. This symposium is a terrific opportunity for the discussion of which technologies will help the industry meet and anticipate future customer demands that will enable wireless communications growth to continue.

While you are here, please take some time to experience Boston. The city is rich in history and is home to more than 70 colleges and universities and some of the best restaurants and shopping areas in America.

On behalf of the Organizing Committee, I warmly welcome you to PIMRC '98 in historic Boston, Massachusetts.

Dennis F. Strigl
General Chairman of PIMRC '98

Greetings from the Organizer and Technical Program Chairman



The occasion of the Ninth IEEE International Symposium on Personal, Indoor and Mobile Radio Communications marks its second occurrence in the United States. In keeping with its history of global diversity in participants and sponsorships, PIMRC '98 offers an outstanding program of technical papers, tutorials, invited lectures, and panel discussions that reflect the truly global view of emerging third-generation wireless networks in the mobile life of the third millennium. As always, we have tried to strike a balance between the

diverse interests of academia and industry, both in the composition of the organizing committee and in the technical content of the program. We have also tried to address issues of interest to designers, manufacturers, and service providers.

The first day of the conference offers tutorials that will provide participants with an opportunity to broaden their understanding of the industry so that they are better prepared to appreciate the

depth of the technical program that will be presented during the following three days.

The second day of the conference will begin with an executive panel discussion addressing the future of the industry from the point of view of senior executives of service providers, consumer products companies, electronic device manufacturers, and regulatory organizations. After this, research results will be presented in parallel technical sessions. Invited papers will begin several of these sessions. The conference also includes two more panels in which the future of technology and marketing will be discussed by leaders in the field. These technical papers and panels describe the latest research, development, and new concepts in various aspects of wireless information networks.

To encourage young researchers, the symposium has allocated several prizes for selected papers written and presented by students.

We are sure that our strong technical program and the charm and attraction of historic Boston will create an enjoyable experience for all participants in the conference.

Kaveh Pahlavan
Organizer and Technical Program Chairman



PIMRC '98 Organizing and Technical Program Committees

General Chairman

Dennis F. Strigl
President and CEO
Bell Atlantic Mobile

Organizer and Technical Program Chairman

Kaveh Pahlavan
Professor, Director CWINS
Worcester Polytechnic Institute

Organizing Committee

Publications Chairman

Allen Levesque, GTE Laboratories Incorporated

Publicity Chairman

Jim Gerace, Bell Atlantic Mobile

Events Chairman

John Orr, Worcester Polytechnic Institute

Exhibits Chairman

Robert Alongi, IEEE Boston Section

Invited Papers Coordinator

Rajamani Ganesh, GTE Laboratories Incorporated

Tutorials Coordinator

Zoran Zvonar, Analog Devices

Bell Atlantic Mobile Liaison

Gerry Flynn, Bell Atlantic Mobile

General Conference Secretary

Jacques Beneat, Worcester Polytechnic Institute

Exhibits Contractor

Erika Targum, Palisades Institute for Research Services, Inc.

EC Liaison

Hamid Aghvami, King's College

Far East Liaison

Shuzo Kato, Uniden Corporation

Registration Chairman

Peter Lanyon, Worcester Polytechnic Institute

Technical Program Committee

R. Agusti, Universitat Politecnica de Catalunya, Spain

J.B. Andersen, Aalborg University, Denmark

V. Bahl, Microsoft Research, USA

W. Baier, University of Kaiserslautern, Germany

Y. Bar-Ness, New Jersey Institute of Technology, USA

L.F. Chang, Bellcore, USA

K.C. Chen, National Taiwan University, Taiwan

P. Chevillat, IBM Zurich Research Division, Switzerland

J. Chuang, AT&T Laboratories, USA

V. Dubey, Nanyang Technological University, Singapore

G. Flynn, Bell Atlantic Mobile, USA

T. Freeburg, Motorola, USA

S. Glisic, University of Oulu, Finland

Z. Haas, Cornell University, USA

M. Kavehrad, Pennsylvania State University, USA

R. Kohno, Yokohama National University, Japan

J.H. Lee, Seoul National University, Korea

P. Leppanen, University of Oulu, Finland

K.B. Letaief, Hong Kong University of Science and Technology,
Hong Kong

A. Levesque, GTE Laboratories, USA

J. Lilleberg, Nokia Mobile Phone, Finland

T. Mathiopoulos, University of British Columbia, Canada

M. Naghshineh, IBM Watson Research Center, USA

M. Nakagawa, Keio University, Japan

N. Pavlidou, Aristotle University of Thessaloniki, Greece

J. Pereira, European Commission, Belgium

R. Prasad, Delft University of Technology, The Netherlands

J. Proakis, Northeastern University, USA

J. Rapeli, Philips Consumer Communications, France

D. Raychaudhuri, C&C Research Laboratories, NEC, USA

J. Russell, AT&T, USA

A. Sheikh, Hong Kong Polytechnic University, Hong Kong

P. Smyth, BT Laboratories, UK

E. Sousa, University of Toronto, Canada

C.-K. Toh, Hughes Research Laboratories, USA

R. Valenzuela, Bell Laboratories, Lucent Technologies, USA

A. Viterbi, Qualcomm, USA

Z. Zvonar, Analog Devices, USA



Program Schedule Overview

Registration

Tuesday: 7:30 a.m.–5:00 p.m. and 7:00 p.m.–9:00 p.m.
Wednesday: 7:30 a.m.–5:00 p.m.

Thursday: 7:30 a.m.–5:00 p.m.
Friday: 7:30 a.m.–Noon

Tuesday, September 8

9:00 a.m.–5:00 p.m.

Tutorials

- Tue-F1 Third-Generation Wireless Personal and Multimedia Communications
- Tue-F2 Wireless Local Loop
- Tue-F3 Multiple Access Protocols for Wireless and Mobile Multimedia Networks
- Tue-F4 Migration From Second-Generation to Third-Generation Mobile Communication Systems

9:00 a.m.–Noon

- Tue-AM1 Analog-to-Digital Conversion and Digital Synthesis for Software Radios
- Tue-AM2 Wireless LANs
- Tue-AM3 Mobile and Wireless ATM Networks
- Tue-AM4 Signal Separation in Multiuser Systems

2:00 p.m.–5:00 p.m.

Tutorials

- Tue-PM1 Integrated Solutions and Chip-Sets for Wireless Communications
- Tue-PM2 Radio Propagation Characteristics in Modern Wireless Systems
- Tue-PM3 Broadband Wireless
- Tue-PM4 Space-Time Codes

7:00 p.m.

Conference Welcome Reception

Wednesday, September 9

8:30 a.m.–10:00 a.m.

Executive Panel

10:30 a.m.–Noon

Technical Sessions

- A1 Wireless Local Loop
- A2 Wideband Local Access
- A3 Wireless ATM I
- A4 Deployment Tools
- A5 Network Planning
- A6 Mobile Services
- A7 Third-Generation Systems
- A8 Network Protocols for Wireless Applications

12:45 p.m.–1:45 p.m.

IMT-2000 and Other Panels

2:00 p.m.–5:00 p.m.

Technical Sessions

- B1 CDMA for Third-Generation Networks
- B2 Multiuser Receivers
- B3 Wireless ATM II
- B4 Challenges in Network Deployment
- B5 Handoff
- B6 ASIC Design for Wireless Applications
- B7 ACTS UMTS
- B8 Geolocation for Wireless Services

6:00 p.m.

Buses Leave Marriott

7:00 p.m.

Cruise of Boston Harbor Aboard the Odyssey



Thursday, September 10

9:00 a.m.–Noon

Tutorial

Thu–AM Universal Mobile Telecommunication System (UMTS)

Technical Sessions

- C1 Interference Cancellation for CDMA Systems
- C2 OFDM I
- C3 Multimedia Wireless
- C4 Indoor and Urban Radio Propagation
- C5 Network Aspects
- C6 Wireless Optical Networks
- C7 ACTS MBS and W-LAN

12:45 p.m.–1:45 p.m.

Future of Wireless Data Communications Panel

2:00 p.m.–5:00 p.m.

Tutorial

Thu–PM IMT-2000 Progress Report

Technical Sessions

- D1 Performance of CDMA Networks
- D2 OFDM II
- D3 Wireless Data
- D4 Propagation Studies I/ Modulation, Coding, and Equalization I
- D5 Power Control
- D6 Smart Antennas
- D7 ACTS System Aspects

7:00 p.m.

Conference Banquet

Friday, September 11

9:00 a.m.–Noon

Tutorial

Fri–AM High-Speed Wireless Data for Internet Applications

Technical Sessions

- E1 CDMA I
- E2 Modulation, Coding, and Equalization II
- E3 Medium Access Methods I
- E4 Propagation Studies II
- E5 Traffic Engineering
- E6 Satellite Networks / TDMA
- E7 ACTS Enabling Technologies

12:15 p.m.–1:45 p.m.

Conference Luncheon

2:00 p.m.–5:00 p.m.

Technical Sessions

- F1 CDMA II
- F2 Modulation, Coding, and Equalization III
- F3 Medium Access Methods II
- F4 Antenna Systems
- F5 Resources Management Techniques
- F6 Spread Spectrum
- F7 GSM
- F8 Security and Privacy / PCS Systems



Invited Papers

The telecommunications industry faces significant challenges as we approach the new millennium. In this increasingly competitive world, there is a need to continually evaluate the technical merits of available and emerging technologies in light of ever-changing business realities. The industry recognizes a need for a paradigm shift in the way we solve problems and seize new opportunities. In this environment, there is an overriding need to steadily improve technical efficiency and to be increasingly responsive to competition.

The PIMRC '98 invited speakers are among the most respected individuals in the telecommunications field today, and the topics they will address are highly relevant to these challenging times. Their papers will cover such diverse areas of wireless communications as wireless ATM, LMDS, third-generation systems, wireless multimedia, and mobile IP. These topics represent some of the most important challenges being faced by the industry today. The invited papers are listed below, with an indication of the technical sessions in which they are to be presented.

**Session A2 — Intelligent and Flexible Radio Access/
Transmission Technologies for Wireless Multimedia
Communication Systems**

Seiichi Sampei, Osaka University

**Session A3 — Current Topics in Wireless and Mobile ATM
Networks: QoS Control, IP Support, and Legacy Service
Integration**

Dipankar Raychaudhuri, C&C Research Laboratories, NEC
USA

**Session A5 — Third-Generation Wireless Technologies:
Expectation and Realities**

Lin-Nan Lee, Hughes Network Systems

**Session A6 — Providing Internet Services to Mobile Phones:
A Case Study With Email**

Krishan Sabnani, Bell Laboratories, Lucent Technologies

**Session A7 — Cluster Mobile Switching Center for Third-
Generation Wireless Systems**

Thomas LaPorta, Bell Laboratories, Lucent Technologies

Session A8 — Service Location Protocol for Mobile Users

Charles E. Perkins, Sun Microsystems

**Session B1 — Challenges of Higher Speed Wireless Internet
Access**

Ahmad R.S. Bahai, ALGOREX, Inc.

**Session B6 — Integrated Circuit Technology for Wireless
Communications: An Overview**

Babak Daneshhrad, University of California, Los Angeles

Session B7 — Perspectives on 3G System Development

Tero Ojanpera, Nokia Research Center

**Session C3 — Energy-Efficient Protocols for Wireless
Systems**

Prathima Agrawal, AT&T Laboratories

**Session C6 — Amplifier Linearization for LMDS
Application**

Mohsen Kavehrad, Pennsylvania State University

**Session C7 — Third-Generation: A Unified Architecture to
Provide Mobile Multimedia**

Jorge M. Pereira, European Commission

Session D3 — On Tractable Wireless Channel Models

Ramesh Rao, University of California, San Diego

**Session D5 — Power Control for Wireless Data Based on
Utility and Pricing**

David Goodman, Rutgers University

**Session D7 — UMTS: Development of Standards for the
Third Generation**

Antun Samukic, SMG European Telecommunications
Standards Institute

**Session E2 — A Simple and Accurate Analysis of Digital
Communication Systems With Diversity Reception in
Different Fading Environments**

Vijay Bhargava, University of Victoria

**Session F3 — Guaranteed QoS Wireless Access to
Broadband Networks**

Kwang-Cheng Chen, National Taiwan University

**Session F6 — Performance Analysis of Wireless Ad Hoc
Networks Based on mMFSK Frequency Hopping
Modulation**

Savo G. Glisic, University of Oulu



Tutorials

Tuesday, September 8, 9:00 a.m.–5:00 p.m.

Tue–F1

Third-Generation Wireless Personal and Multimedia Communications

Ramjee Prasad, Delft University of Technology, The Netherlands

The first part of this tutorial will be an overview of wireless personal and multimedia communications, including a review of air-interface access schemes.

The second part of the tutorial will be a discussion of the latest developments in the standardization of third-generation systems, especially developments related to WCDMA in ETSI and ARIB, Wideband CDMA in TR45.5, and IS-136. High-speed data proposals for IMT-2000 will be highlighted, with the key parameters and the reasoning behind them discussed. Topics will include channel bandwidth, chip rate, channel structures, implementation of variable-bit-rate capabilities, transmission of simultaneous services (multicall), high-bit-rate packet data, and new handover schemes. In addition to the regional standards bodies, the role of the ITU-R radio transmission technologies (RTT) evaluation process in the development of third-generation air-interface standards will be discussed.

The third part of the tutorial will address the evolution of second-generation core networks such as GSM and IS-41 toward third-generation networks. New capabilities such as variable-rate packet data, multicall capabilities, and guaranteed quality of service for packet data services place new requirements on second-generation networks. The potential of second-generation networks to evolve toward third-generation networks will be presented in relation to these requirements. Specific enhancements to their protocols and interfaces will also be proposed.

Tuesday, September 8, 9:00 a.m.–5:00 p.m.

Tue–F2

Wireless Local Loop

Joe DeCamp and Lee Kuoni, Motorola, USA

The purpose of this tutorial is to provide an overview of wireless local loop (WLL) technology and systems, as well as a market overview. Evolution of WLL will be presented, followed by the state of the market and deployment status, opportunities, and forecasts. Comparison of technologies will include wireless versus wireline access, micro versus macro, cordless, cellular, and proprietary technologies. A networking deployment presentation will focus on licensing and spectrum allocation, development of the business case, engineering issues in deploying the system, and subscriber unit installation and distribution. Issues arising in the commercialization of the system include public relations, marketing and promotion, and customer care and service. Following a case study, the future of WLL will be examined in the light of new technologies and solutions.

Tuesday, September 8, 9:00 a.m.–5:00 p.m.

Tue–F3

Multiple Access Protocols for Wireless and Mobile Multimedia Networks

Krishna M. Sivalingam, Washington State University, USA

Prathima Agrawal, AT&T Laboratories, USA

Parameswaran Ramanathan, University of Wisconsin, USA

Typical Medium Access Control (MAC) protocols only coordinate access to a shared medium, in both wired and wireless networks. In future wireless and mobile multimedia networks, MAC protocols will have a significantly more complex role. MAC protocols will be primarily responsible for the allocation of bandwidth and for the coordination and scheduling of packet transmissions on a shared communication link. In contrast to MAC protocols in wireline networks, MAC protocols for wireless networks must also deal with issues such as mobility, error control, and energy conservation. Present-day MAC protocols for wireless networks are designed mainly for voice and data communication. However, the next-generation protocols are expected to provide integrated support for multimedia applications containing voice, video, and data. With the emergence of wireless local loops, MAC protocols for voice and Internet access are also receiving considerable attention.

This full-day tutorial will begin with a discussion of the evolution of MAC protocols for wireless networks. The focus will then turn to current MAC protocols for voice communication in cellular networks, data communication in cellular networks, and voice and data communication in wireless local loops. In particular, the tutorial will cover standards, techniques, and protocols such as IS-54, IS-136, GSM, ARDIS, RAM, CDPD, IEEE 802.11, and HiperLAN. Issues and solutions in the design of next-generation MAC protocols from recent papers will be discussed. Techniques for quality-of-service guarantees, energy efficiency, and error control in MAC protocols will be covered. Insights and experiences gained from testbeds such as SWAN, BARWAN, WATMnet, etc., will also be presented. Finally, there will be a brief discussion of interaction between the MAC and other protocol layers; several unresolved problems and issues in this area will be highlighted.

Tuesday, September 8, 9:00 a.m.–5:00 p.m.

Tue–F4

Migration From Second-Generation to Third-Generation Mobile Communication Systems

Hamid Aghvami, King's College, UK

This tutorial will address the various approaches being taken to meet the requirements of third-generation mobile systems (UMTS and IMT-2000). After a brief description of GSM and IS-95, migration paths from IS-95 to wideband CDMA and from GSM to UMTS air interfaces will be discussed.



A GSM-CDMA system operating within the GSM network with an IS-95 air interface has recently been introduced. It is claimed that the addition of CDMA radio access into the GSM network provides a wide range of economic and operational benefits. A field trial of the system was carried out in the UK this year. Technical aspects and the architecture of this system will be discussed.

For the first phase of UMTS, Europe has decided to adopt an evolutionary approach for the UMTS core network based on migration from the present GSM infrastructure. For the air interface, however, a revolutionary approach has been chosen. ETSI SMG2 has recently selected the wideband CDMA concept for the paired spectrum band (FDD mode) and the TD/CDMA concept for the unpaired spectrum band (TDD mode) for UMTS Terrestrial Radio Access (UTRA). The technical and operational aspects of these concepts will be described and discussed.

Tuesday, September 8, 9:00 a.m.–Noon
Tue–AM1

Analog-to-Digital Conversion and Digital Signal Synthesis for Software Radios

Brian D. Woerner and Jeffrey H. Reed, Virginia Tech, USA

As commercial wireless communications services grow more varied and numerous, there is a strong need for radios which flexibly adapt to multiple requirements for air interfaces, frequency bands, bandwidth, and quality of service. Continuing advances in digital signal processing have enabled implementation of increasing amounts of radio functionality as flexible signal processing operations controlled by software. This long trend has inspired the popular notion of a “software radio.”

The transition between digital and analog signals is central to any notion of software radio. For the foreseeable future, this transition will occur at intermediate frequencies. At the transmitter, modulated signals are generated using direct digital synthesis technologies, before RF processing. At the receiver, incoming down-converted signals are sampled and digitized at intermediate frequencies. This half-day tutorial will focus on the two key operations of digital signal synthesis and analog-to-digital conversion.

Tuesday, September 8, 9:00 a.m.–Noon
Tue–AM2

Wireless LANs

Craig Mathias, Fairpoint Group, USA

Wireless LANs are an often overlooked element of the wireless data landscape, but one with a strong market presence and a clear set of both vertical and horizontal applications. Wireless LAN technology forms the basis of a broad range of products, from data collection to office applications to metropolitan-area bridges. This

tutorial is designed for those familiar with the basics of wireless communications and LAN technology, but not necessarily with wireless LANs. The tutorial will begin with a review of the core issues in wireless data communications, and will then examine the major tradeoffs in wireless LAN design. This will include a review of spread-spectrum communications. Key applications will be looked at, and a number of products will be examined in some depth, covering the major technology choices and discussing the advantages and disadvantages of each. Finally, key technology and product trends will be examined, including speculations about a number of exciting potential applications for wireless LANs.

Tuesday, September 8, 9:00 a.m.–Noon
Tue–AM3

Mobile and Wireless ATM Networks

Guy Omidar, GTE-Telecom, Egypt

In the early 1990s, several institutions began to work on extension of ATM into wireless networks. The challenge was to extend ATM capabilities into wireless media—the media that do not recognize the kind of quality of service promised by ATM. Through the years, there has been an increase in the number of contributions to major conferences by experts in this field. ATM technology and its access to wireless networks will be widely deployed over the next decade. Integration of portable wireless access and mobility features into wired-ATM networks can present a cost-effective and efficient way to provide seamless end-to-end connectivity in a market where demands on wireless networks have grown rapidly and have been predicted to generate billions of dollars in revenue by the end of the century. The deployment of broadband cell-based technologies and their integration with emerging wireless access networks are expected to become increasingly important. Although wired ATM is moving rapidly toward becoming the technology of choice, the area of wireless ATM is an emerging technology that still has many issues that need to be resolved. The areas for immediate consideration in mobile and wireless ATM are mobility and connection management, location management, connection establishment, handover and handoff algorithms, quality-of-service provisioning, interworking of wireless ATM with wireline, and wireless ATM standardization and implementation. Another area of interest is multiple access techniques to carry ATM traffic. This year the successful launching of the low orbit (LEO) Iridium satellites has initiated the first mobile LEO satellite communications network. Global personal communications services will be attractive for those countries that otherwise could not provide terrestrial links in a cost-effective manner. The new GEO satellite network will provide digital television broadcasting and high data voice channel transmission for future use. Some are suggesting that wireless ATM could be present onboard satellites, and work is also in progress to make ATM survivable. Researchers are actively involved in designing



mobile and wireless algorithms, and they have learned from past experience how to introduce mobility features (mobility features will also be discussed in this tutorial).

Tuesday, September 8, 9:00 a.m.–Noon
Tue–AM4

Signal Separation in Multiuser Systems

Yeheskel Bar-Ness, New Jersey Institute of Technology, USA

Frequency reuse has become important in many communication systems. Most users are sharing the same frequency bandwidth by implementing code, polarization, or other distinguishing orthogonal properties of signals. Signal multiplexing methods are used in dually polarized satellites and terrestrial microwave links, overlapping frequency bands for constant modulus modulation systems, and mobile and personal indoor and outdoor communications. Clearly the performance of these systems depends largely on co-channel interference. Particularly for the non-stationary fading environment, adaptive cancelers are needed. In this tutorial, methods of adaptive signal separation, such as cross-coupled PLL, constant modulus separators, and cross-polarization cancelers, will be reviewed. New methods of adaptive interference cancellation for multiuser code-division multiple-access (CDMA) will be presented.

Tuesday, September 8, 2:00 p.m.–5:00 p.m.
Tue–PM1

Integrated Solutions and Chip-Sets for Wireless Communications

Christian Kermarrec and Frederic Boutaud, Analog Devices, USA

This tutorial will address issues associated with implementation of wireless communication systems using highly integrated solutions such as specialized chip-sets. System partitioning of wireless systems will be presented based on its current technology status. Major factors relevant to radio-frequency (RF) integrated circuit (IC) design will be addressed, including radio transceiver architecture based on optimal system and chip partitioning, as well as optimal use of software techniques; semiconductor technology for optimal performance, cost, and integration path; and circuit implementation based on requirements of wireless systems. Examples of integrated RF chip-sets for different standards will be presented.

Mixed signal presents an enabling technology for modern digital implementations. Different architectural approaches to the design of analog-to-digital and digital-to-analog converters will be outlined, together with major system-level requirements for wireless applications. Some of the transceiver architectures based on wideband conversion technologies will be presented, and state-of-the-art components for wireless design will be summarized.

Ingredients for the development of wireless communication baseband VLSI circuits will include digital CMOS technology, design tradeoffs based on system requirements and technology constraints, and signal processing technology. A review of the main characteristics and associated metrics is proposed. Evolution and future trends will be discussed. The impact of wireless-specific standards on DSP and baseband processors will be presented, with selected chip-set realizations illustrating major trends.

Tuesday, September 8, 2:00 p.m.–5:00 p.m.
Tue–PM2

Radio Propagation Characteristics in Modern Wireless Systems

Henry Bertoni, Polytechnic Institute of Brooklyn, USA

The characteristics of the radio channel in urban environments place severe constraints on wireless system performance. System design and installation require a familiarity with the observed characteristics and an understanding of the physical mechanisms and environmental features that give rise to them. This tutorial will review the results obtained in various channel measurements for both narrowband and pulsed excitation. The basic physical processes of propagation, reflection and transmission, diffraction, and scattering will be reviewed. The tutorial will discuss how these basic processes can be used to understand the influence of the urban environment on the observed channel properties and to construct propagation prediction models. The theory behind generic building of environment models, such as COST 231, and site-specific models will be discussed. Emphasis will be placed on relating predicted behavior to relevant measurements, and on identifying areas in which there is currently a lack of theoretical understanding.

This tutorial is intended for technical workers with a limited background in wave propagation, such as an undergraduate course in electromagnetics, who wish to achieve a deeper understanding of the wireless radio channel.

Tuesday, September 8, 2:00 p.m.–5:00 p.m.
Tue–PM3

Broadband Wireless

Tom Freeburg, Motorola, USA

This tutorial will address different applications, including wireless LANs, multimedia access in the local loop, backbone carriage, existing CLECs, and peer networks. Characteristics of frequency bands for the operation of broadband wireless will be presented, with an overview of the RF environment, path loss indoors and outdoors, the basics of multipath propagation, and the techniques to overcome it (equalization, multicarrier, smart antennas). The technology overview will include a discussion of modulation methods, radio implementation, transmitter and



receiver architectures, and integration approaches. Selected topics from the following standards groups will be presented: the ATM Forum, IEEE 802.11, ARIB, ETSI (HiperLAN, Bran, Daws), and the HomeBus Consortium.

Tuesday, September 8, 2:00 p.m.–5:00 p.m.
Tue–PM4

Space-Time Codes

A.R. Calderbank, Ayman Naguib, Nambi Seshadri, and
Vahid Tarokh, AT&T Laboratories, USA

Physical limitations on wireless channels present a fundamental technical challenge to reliable communication. Bandwidth limitations, propagation loss, noise, interference, and multipath fading make the wireless channel a narrow pipe that does not readily accommodate rapid flow of data. Deploying multiple antennas at both transmitter and receiver increases the capacity of wireless channels, and the standard approach to realizing this capacity is linear processing at the receiver. By contrast, transmit diversity schemes use processing at the transmitter to spread information across the antennas. This tutorial describes space-time codes, a new coding paradigm in which signal processing at the receiver is combined with coding techniques appropriate to multiple transmit antennas. With only two antennas at the transmitter and receiver, it is possible to design systems in which the reliability/throughput far exceeds systems in use today.

Thursday, September 10, 9:00 a.m.–Noon
Thu–AM

Universal Mobile Telecommunication System (UMTS)
Philippe Lucas, Cegetel, France

In Europe, third-generation mobile systems are known as UMTS (the Universal Mobile Telecommunication System) and have been standardized by the European Telecommunications Standards Institute (ETSI). It is expected that UMTS will be commercially available in 2002 and will reach mass-market for mobile multimedia applications in 2005. The first phase of UMTS is characterized by the provision of actual services such as speech, SMS, and fax, and by the extension of fixed services such as Internet/intranet access, e-commerce, and video-conferencing applied to the mobile environment. In addition, the concept of the Virtual Home Environment allowing users to exploit their own sets of services irrespective of the network or the access part will be an essential UMTS feature. In a second phase, UMTS will be characterized by the ability to use services on any access means (cellular, cordless, fixed, satellite) connected to a unified core network. In order to achieve this goal, the core network targeted for UMTS should have a clear split between the access systems and the core network part. Europe and Japan have agreed to achieve this by an evolution of the GSM core network. This requires some evolution of actual GSM

capabilities. In particular, GSM should be able to switch services with bandwidth greater than 64 kb/s; provide variable-bit-rate services to optimize the usage of spectrum and guarantee quality of service; and provide mechanisms to implement Virtual Home Environment features. In addition, UMTS addresses specific spectrum and therefore requires a new radio access system able to transmit up to 2 Mb/s depending on the usage.

Thursday, September 10, 2:00 p.m.–5:00 p.m.
Thu–PM

IMT-2000: Wireless Into the Next Millennium
John Marinho, Lucent Technologies, USA

At the turn of the century, the world population of wireless subscribers will exceed one-half billion. Industry growth continues to outpace projections, particularly in the Asia/Pacific and Latin American regions of the world. The demand for new services to support data, the Internet, and advanced image and video applications are driving the establishment of new standards and technologies to provide for higher bandwidth and increased throughput in wireless networks. These standards and technologies are being proposed by various regions to the ITU under the umbrella of IMT-2000, which is scheduled for completion by the end of 1999. Based on these developments, it may be reasonable to expect that in the next millennium, wireless will become the preferred medium of access to telecommunications services and networks on a global scale.

Friday, September 11, 9:00 a.m.–Noon
Fri–AM

High-Speed Wireless Data for Internet Applications
Justin Chuang, AT&T Laboratories, USA

Cellular radio services have been extremely successful in providing untethered voice communications. With the advent of new personal communications services, wireless access is expected to become even more popular. However, wireless data services have captured only a limited market share so far. One obstacle for wireless data services is their limited capability in both technology and applications. On the other hand, personal computers and Internet services have experienced explosive growth during the past three years due to low-cost, high-performance computer technologies and attractive network applications. The popularity of the World Wide Web is further accelerating market penetration. It is timely to consider a synergistic combination of wireless, computer, and Internet technologies to provide Advanced Cellular Internet Services (ACIS) using a wide-area cellular network for ubiquitous information access.

There appears to be a proven market for popular applications such as Web browsing and information exchange over the Internet. A major barrier is a cellular network's capability to transport



bandwidth high enough to meet the needs of these applications. Existing wireless data rates, up to several tens of kilobits, may be over one order of magnitude short of what is required to make popular applications user-friendly.

Among the many challenging tasks of wireless information networking there exist two fundamental limits imposed by the radio channel: transmission bandwidth limitation caused by multipath propagation; and co-channel interference caused by frequency reuse. The first part of this tutorial will outline two design methodologies to overcome these limitations: signal processing techniques which counter fading and interference in the physical layer; and multiple access techniques which improve system performance through radio resource management. Implementation of these techniques in existing systems and standards, including wireless LAN, wireless data networks, and

second-generation data services, is reviewed in the second part of the tutorial. In the third part of the tutorial, these technologies will be applied in designing high-speed wireless data networks for emerging applications such as Internet Web browsing. An introduction to traffic models and a discussion of emerging third-generation approaches will also be included.

Key technologies used in Enhanced Data for GSM Evolution and an OFDM-Based ACIS System will be discussed. The first system employs link adaptation with adaptive modulation/coding schemes and fixed frequency reuse. The second system proposes a Dynamic Packet Assignment for resource allocation and uses OFDM and smart antennas, with possible link adaptation for the physical layer. CDMA with multicode for data applications will also be discussed briefly.



Panels

Lively, issue-oriented, and thought-provoking panel discussions have always been a highlight of PIMRC conferences. Each year, conference participants have a unique opportunity to join in discussions with leaders in the wireless industry who have been invited to share their viewpoints and visions. This year will be no exception, but we have planned something special.

Instead of the standard Keynote Address, PIMRC '98 will open with an Executive Panel featuring top government and industry executives from North America, the EC, Japan, and other countries. Dennis Strigl, Chairman and CEO of Bell Atlantic Mobile, and the recipient of the Achievement Award for Outstanding Leadership at the Fourth Annual Cellular Telecommunications Industry Association (CTIA) Conference, will lead the panel in a discussion of the future direction of the industry from the viewpoint of a service provider. Other panelists will include Shuzo Kato, CEO of

Uniden, Japan, who will talk about his vision for the future of consumer products; and Russ Johnsen, Vice President of the Communications Division of Analog Devices, who will discuss the future direction of the industry from a device manufacturer's perspective. Invited panelists also include a top executive of the ACTS research program in the EC, who will represent the research community; and the minister of telecommunications in a country with a rapidly growing telecommunications market, who will discuss issues related to the huge market evolving in various regions of the world.

So that all conference participants can benefit from the Executive Panel, no other activities are being planned for this time period. Other panels, which will address such key issues as IMT-2000 and the future of wireless data communications, will be scheduled during the lunch breaks on Wednesday and Thursday.

Exhibits

Exhibits, displays, and demonstrations will complement the conference's technical sessions and will provide exhibitors from the communications industry, government, and research organizations with an opportunity to showcase their activities, products, and services.

The exhibit schedule will leave ample time for conference attendees to visit the exhibition area. In addition, extended breaks will be built into the conference schedule to ensure that attendees can visit the exhibits without missing any of the technical program.

To request an exhibitor application package or to obtain more information, contact:

Erika Targum
Director of Sales
Palisades Institute for Research Services, Inc.
201 Varick Street
New York, NY 10014
Phone: 212-620-3375
Fax: 212-620-3379
E-mail: etargum@newyork.palisades.org

Wednesday, September 9
9:30 a.m. to 5:00 p.m.

Thursday, September 10
9:30 a.m. to 5:00 p.m.

Friday, September 11
8:30 a.m. to 1:00 p.m.



Conference Arrangements

General Information

The Ninth IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC '98) will be held at the Marriott Copley Place in Boston, Massachusetts, from September 8 through September 11, 1998. Information about PIMRC '98 (including conference registration form and hotel reservation form) is available on the Internet at:

<http://www.pimrc98.wpi.edu>

Inquiries may also be directed to:

Kaveh Pahlavan
PIMRC '98 Organizer and Technical Program Chairman
ECE Department
Worcester Polytechnic Institute
100 Institute Road
Worcester, MA 01609

Phone: 508-831-5634

Fax: 508-831-5491

E-mail: kaveh@ece.wpi.edu

Registration Information

Advance registration is encouraged. Please complete the registration form (see page 19) and return it before July 15 to receive the early registration discount. Payment (in US \$) must accompany the registration form.

The Registration Desk at the Marriott Copley Place will be open as follows:

- | | |
|--------------------------|---------------------|
| • Tuesday, September 8 | 7:30 a.m.–5:00 p.m. |
| | 7:00 p.m.–9:00 p.m. |
| • Wednesday, September 9 | 7:30 a.m.–5:00 p.m. |
| • Thursday, September 10 | 7:30 a.m.–5:00 p.m. |
| • Friday, September 11 | 7:30 a.m.–Noon |

All conference participants must check in at the Registration Desk. Your conference identification badge and other important conference materials will be distributed at registration.

About Boston

Known as America's Walking City, Boston is also the historical, educational, and cultural center of the Northeast. From Beacon Hill's maze of narrow, cobblestoned walkways, to downtown's soaring skyscrapers and jam-packed streets, to the waterfront's rambling wharf buildings, Boston is both eclectic and charming.



In early September, the weather in Boston should be just perfect for exploring the city on foot.

The conference hotel, the Marriott Copley Place, is located in the heart of Boston's historic Back Bay, within walking distance of the Boston Public Gardens; the theater district; upscale boutiques, restaurants, and galleries; and many of the city's most popular attractions.

Visit the campus of one of Boston's many colleges and universities.

Spend some time at the Museum of Science or the Museum of Fine Arts. Walk the Freedom Trail. Tour the JFK Memorial Library. Experience Quincy Market. Take full advantage of all that PIMRC '98 has to offer, but also take some time to see why Boston is one of the most popular conference venues in the United States.

For more information on Boston, see these Web sites:

- <http://www.boston.com>
- <http://www.boston.yahoo.com>
- <http://www.bostonusa.com>
- <http://www.boston-online.com>
- <http://www.massport.com/logan/logan.html>



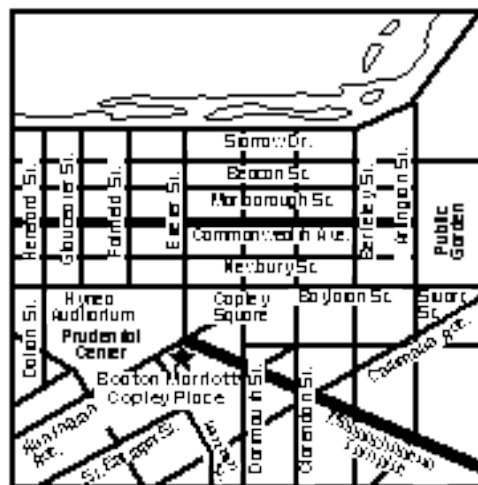
Conference Hotel



Boston Marriott Copley Place
110 Huntington Avenue
Boston, MA 02116

Phone: 617-236-5800 or 800-228-9290
Fax: 617-236-5885

<http://www.marriott.com/marriott/bosco/home.htm>



Marriott Copley Place

A block of rooms has been reserved for PIMRC '98 attendees at the Marriott Copley Place, located in Boston's fashionable Back Bay. With beautiful guest rooms, your choice of six restaurants, and a full-service health club, the Marriott offers everything you'll need to be comfortable during your visit to Boston for PIMRC '98.

The Marriott is part of the Boston Convention Complex, which includes more than 200 shops, restaurants, and cafes—all connected by climate-controlled walkways.

Transportation

The Marriott Copley Place is fewer than 5 miles from Logan International Airport. Commercial limousines, taxis, and the nearby Boston subway system all provide transportation between the Marriott and the airport.

- Taxi: Taxi fare from the airport to the Marriott Copley Place is approximately \$18.
- Bus service: Several services are available, including City Transportation (617-561-9000), which picks up at all terminals (outside baggage claim at the bus stand) on the hour and half hour from 6:30 a.m. to 11:00 p.m. Fare one way is \$7.50.
- Public transportation: Take shuttle bus number 22 or 33 from terminal to MBTA subway station. Fare is \$0.85.

Reservations

Please use the form on page 17 to make your hotel reservation. For you to receive the special conference rate, your reservation request must be received by August 18.



PIMRC '98 Hotel Reservation Request Form

Boston Marriott Copley Place
110 Huntington Avenue
Boston, MA 02116

Phone: 617-236-5800 or 800-228-9290 • Fax: 617-236-5885

**Make reservation by calling the hotel or mailing or faxing this form to the hotel.
Reservation request must be received by the hotel by August 18, 1998.**

Conference room rates:
Single — \$145; Double — \$165; Extra Person — \$20
Plus applicable taxes (12.45%)

Name _____

Street Address _____

City _____ State _____

Postal / ZIP Code _____ Country _____

Telephone _____

Arrival Date _____ Departure Date _____

Number of Adults _____ Number of Children _____

If you are sharing a room, name of person you are sharing with _____

1 King-Size Bed _____ 2 Double Beds _____

Smoking _____ No Smoking _____

Special Requests _____ Handicap Access _____

One night's deposit is required to guarantee reservation.

Check (US funds, no cash) enclosed payable to Boston Marriott Copley Place — or guarantee via credit card (AMEX, Diners, MasterCard, VISA, Discover):

Credit Card Type _____ Number _____ Expiration Date _____

Signature of Cardholder _____

Cancellation policy: To cancel, call the hotel and request a cancellation number. If you fail to arrive and do not cancel a guaranteed reservation prior to 6:00 p.m. on the day of your anticipated arrival, you will be billed for one night's room, and your reservation will be canceled.



Social Events

Tuesday, September 8, 7:00 p.m.
Conference Welcome Reception
(Included with full conference registration)
Sponsored by



Wednesday, September 9, 7:00 p.m.
Cruise of Boston Harbor
(Separate registration is required)
Sponsored by



LABORATORIES



On Wednesday evening, there will be a cruise of Boston Harbor on the beautiful cruise ship Odyssey. A lavish buffet dinner and welcome reception on boarding are included. Odyssey is one of the largest fine-dining cruise ships in Boston Harbor. Three climate-controlled decks will offer you a distinctive atmosphere reminiscent of the classic ocean liners. You'll discover the richness of oak and brass accents in her newly renovated interiors, enticing dance floors, and stunning skyline views from every table. Your evening on the Odyssey is sure to be a memorable part of your trip to Boston for PIMRC '98.

6:00 p.m. Buses Leave Marriott
7:00 p.m. Cruise of Boston Harbor

Thursday, September 10, 7:00 p.m.
Conference Banquet
(Included with full conference registration)
Sponsored by



Friday, September 11, 12:15 p.m.
Conference Luncheon
(Included with full conference registration)



PIMRC '98

The Ninth IEEE International Symposium on
Personal, Indoor and Mobile Radio Communications
Boston Marriott Copley Place, Boston, Massachusetts, USA
September 8-11, 1998

REGISTRATION FORM

Please type or print clearly in CAPITAL letters.

Only one registrant per registration form.

☐ Dr. ☐ Mr. ☐ Ms.

First Name

Last Name

Company/Organization

Street Address

City

Prov/State

ZIP or Postal Code

Country

Telephone Number

Fax Number

E-mail

IEEE Membership Number

IEEE MEMBER

☐ FULL (includes sessions, exhibit, record, reception, banquet, and luncheon on Friday)

☐ 1 DAY (includes sessions and exhibit)

☐ Wed ☐ Thu ☐ Fri

Before July 15

After July 15

\$450

\$550

\$

\$225

\$275

\$

NONMEMBER

☐ FULL (includes sessions, exhibit, record, reception, banquet, and luncheon on Friday)

☐ 1 DAY (includes sessions and exhibit)

☐ Wed ☐ Thu ☐ Fri

\$550

\$650

\$

\$275

\$325

\$

STUDENT MEMBER (proof required)

☐ (includes sessions and exhibit)

\$225

\$275

\$

TUTORIALS

Tuesday Full-Day Tutorials (9:00 am–12:00 pm/2:00 pm–5:00 pm)

☐ Tue-F1 — Third-Generation Wireless Personal and Multimedia Communications, Prasad

☐ Tue-F2 — Wireless Local Loop, DeCamp, Kuoni

☐ Tue-F3 — Multiple Access Protocols for Wireless and Mobile Multimedia Networks, Sivalingam

☐ Tue-F4 — Migration from Second-Generation to Third-Generation Mobile Communication Systems, Aghvami

\$225

\$275

\$

Tuesday Morning Half-Day Tutorials (9:00 am–12:00 pm)

☐ Tue-AM1 — Analog-to-Digital Conversion and Digital Signal Synthesis for Software Radios, Woerner and Reed

☐ Tue-AM2 — Wireless LANs, Mathias

☐ Tue-AM3 — Mobile and Wireless ATM Networks, Omidyar

☐ Tue-AM4 — Signal Separation in Multiuser Systems, Bar-Ness

\$150

\$190

\$

Tuesday Afternoon Half-Day Tutorials (2:00 pm–5:00 pm)

☐ Tue-PM1 — Integrated Solutions and Chip-Sets for Wireless Communications, Kermarrec and Boutaud

☐ Tue-PM2 — Radio Propagation Characteristics in Modern Wireless Systems, Bertoni

☐ Tue-PM3 — Broadband Wireless, Freeburg

☐ Tue-PM4 — Space-Time Codes, Calderbank, Naguib, Seshadri, Tarokh

\$150

\$190

\$

Thursday Morning or Afternoon, and Friday Morning Half-Day Tutorials

☐ Thu-AM — Universal Mobile Telecommunication System, Lucas

☐ Thu-PM — IMT-2000: Wireless Into the Next Millennium, Marinho

☐ Fri-AM — High-Speed Wireless Data for Internet Applications, Chuang

\$150

\$190

\$

\$150

\$190

\$

\$150

\$190

\$

ADDITIONAL OPTIONS

☐ Social Event (Harbor Cruise) on Wednesday (not included above)

☐ Banquet on Thursday (ticket included in each full registration)

☐ Luncheon on Friday (ticket included in each full registration)

☐ Additional Conference Record

☐ Additional CD-ROM

\$60

\$60

\$

\$75

\$75

\$

\$40

\$40

\$

\$100

\$100

\$

\$20

\$20

\$

Indicate any special dietary needs: vegetarian, kosher, other (explain):

Total Amount \$

Please charge my ☐ VISA ☐ MasterCard ☐ Discover ☐ American Express

Cardholder's Name

Card Number

Expiration Date

☐ Enclosed is a check or money order payable to WPI/PIMRC '98 (drawn from a US bank). Do not mail check or money order after August 20.

☐ Enclosed is a copy of the bank/wire transfer payment to PIMRC '98. Fleet Bank of Mass. F/K/A, Shawmut Bank NA, Boston, MA, ABA federal wire routing number 011500010, for the account of Worcester Polytechnic Institute account number 0303272519. Please add \$20 to cover wire transfer fee.

Date

Signature

Mail or fax completed form to:

Kaveh Pahlavan (PIMRC '98)

ECE Department

Worcester Polytechnic Institute

100 Institute Road

Worcester, MA 01609

Fax 508-831-5491

Registration will be completed only upon receipt of payment. No refunds after July 15, 1998. Substitutes are permitted. \$50 cancellation fee for cancellations received before July 15, 1998.

For information regarding online registration, see the PIMRC '98 Web site:

<http://www.pimrc98.wpi.edu>



Technical Session Overview

Wednesday, September 9 — Morning

A1 Wireless Local Loop Chairs: Joe DeCamp and Lee Kuoni	A2 Wideband Local Access Chair: Pierre Chevillat	A3 Wireless ATM I Chair: C.-K. Toh	A4 Deployment Tools Chair: Reinaldo Valenzuela
Mitigating Interference in Wireless Local Loop DS-CDMA Systems H. Huang, J. Smee Forward Link Soft-Handoff Gain of IS-95 CDMA System for Wireless Local Loop Networks A. Aksu, W. Biagini, H. Stellakis ASIC Implementation of a High Efficiency CDMA Receiver for a High Data Rate WLL System L. Oppermann, N. Weste The Capacity of a Wireless Local Loop Network Based on GSM T. Klingenbrunn, P. Mogensen	Intelligent and Flexible Radio Access/Transmission Technologies for Wireless Multimedia Communication Systems S. Sampei (<i>Invited Paper</i>) Broadband Radio Access Integrated Network (BRAIN) in MM-Wave Band: Indoor Wireless LAN Prototype G. Wu, Y. Hase, M. Inoue Development and Evaluation on the Millimeter-Wave Indoor Wireless LAN Demonstrators A. Kato, T. Manabe, T. Ihara, M. Fujise Frequency-Offset Invariant Equaliser for Broadband Wireless Networks A.E. Jones, R. Perry	Current Topics in Wireless and Mobile ATM Networks: QoS Control, IP Support, and Legacy Service Integration D. Raychaudhuri (<i>Invited Paper</i>) A Pseudo Bayesian ALOHA Algorithm With Mixed Priorities for Wireless ATM V.C.M. Leung, J.-F. Frigon An Experimental Architecture for Providing QoS Guarantees in Mobile Networks Using RSVP K.M. Sivalingam, I. Mahadevan Fair Queueing Wireless ATM MAC Protocols R. Sigle, T. Renger	Multi-Cell Coverage Predictions: A Massively Parallel Approach Based on the ParFlow Method B. Chopard, P. Luthi Site Specific Narrowband and Wideband Modeling of Indoor Radio Channel Using Ray Tracing M. Hassan-Ali, K. Pahlavan Statistical Optimization of a Slope UTD Model for the Determination of Coverage Zones Y. Pousset, R. Vauzelle Planning Indoor Wireless Communication System M.-L. Dai
A5 Network Planning Chair: Hamid Aghvami	A6 Mobile Services Chair: Tero Ojanpera	A7 Third-Generation Systems Chair: Li Fung Chang	A8 Network Protocols for Wireless Applications Chair: Victor Bahl
Third-Generation Wireless Technologies: Expectation and Realities L.-N. Lee (<i>Invited Paper</i>) Optimisation of Micro-Cellular Areas by Minimising the Number of Base Stations D. Kristic, L.M. Correia Cost-Effective Selection of Radio Access Ports in Dense Wireless Systems R. Stanley, A. Levesque Outage Probability of CDMA-TDD Micro Cells in a CDMA-FDD Environment H. Haas, G.J.R. Povey	Providing Internet Services to Mobile Phones: A Case Study With Email K. Sabnani (<i>Invited Paper</i>) Overview and Capacity of the GPRS C. Ferrer, M. Oliver Performance Analysis of a Hybrid ARQ for IP Packet Transmission in Fading Channels A.R. Prasad, K. Seki Battery Power Sensitive Video Processing in Wireless Networks P. Agrawal, J. Chen, K. Sivalingam, P. Ramanathan, S. Kishore	Cluster Mobile Switching Center for Third-Generation Wireless Systems T. LaPorta (<i>Invited Paper</i>) Authentication Schemes for Third Generation Mobile Radio Systems S. Putz, R. Schmitz, F. Tonsing Performance Analysis of a Multilink Packet Access for Next Generation Wireless Cellular Systems B. Jabbari, E.H. Dinan, W. Fuhrmann The Realistic Network Evolution Towards Third Generation Mobile Communications N. Lobley	Service Location Protocol for Mobile Users C.E. Perkins (<i>Invited Paper</i>) A Medium Access Protocol for Wireless LANs Which Supports Isochronous and Asynchronous Traffic C. Romans, J. Tourrilhes Power Efficient MAC Protocol for Multihop Radio Networks S. Singh, C.S. Raghavendra Fast Collision Resolution With SDMA for the DSA++ MAC Protocol for Wireless ATM Networks U. Vornefeld, E. Weltersbach



Wednesday, September 9 — Afternoon

B1 CDMA for Third-Generation Networks Chair: Savo Glisic

**Challenges of Higher Speed
Wireless Internet Access**
A.R.S. Bahai (*Invited Paper*)

**A Capacity Comparison of TDMA
and CDMA for Broadband Wireless
Packet Access**
M. Zorzi, S.V. Krishnamurthy,
A.S. Acampora

**Downlink OFDM Techniques in
3rd Generation TDMA Based
Mobile Systems**
J.P. Castro, E. Hallmann

**CDMA Packet Transmission
Control in the Third Generation
Mobile Communications System**
M. Nagatsuka, Y. Ishikawa,
J. Hagiwara, T. Nakamura

**Radio Resource Knapsack Packing
for WCDMA Air Interface**
J. Laakso, R. Jantti, M. Rinne,
O. Salonaho

**Link Capacity Analysis of a
Wideband CDMA System**
P. Xie, H. Sugimoto

**A Study on Bi-Orthogonal
Modulation for W-CDMA Higher
Bit Rate Transmission**
H. Murai, N. Voyer, T. Fujino

**Performance of a Common Channel
Packet Access in WCDMA**
F. Khan

B2 Multiuser Receivers Chair: Jorma Lilleberg

**Semi-Blind Decorrelating Multi-
User Detectors for CDMA:
Subspace Methods**
A. Host-Madsen

**Novel Iterative Multi-User
Receiver for Asynchronous CDMA
Systems in Rayleigh Fading
Channels**
J. Lilleberg, W. Haifeng

**Iterative Multi-User Detection for
Convolutionally Coded
Asynchronous DS-CDMA**
M.C. Valenti, B.D. Woerner

**Non-Coherent Multiuser Detection
for Non-Orthogonal Binary
Modulation**
M.K. Varanasi, D. Das

**MMSE Multi-User Detection for
Asynchronous Dual-Rate Direct
Sequence CDMA Communications**
M. Lops, S. Buzzi, A.M. Tulino

**Performance Evaluation of Multi-
User Detectors for Synchronous
DS-CDMA Systems Over Multi-
Path Rayleigh Fading Channels
With AWGN**
A.J. Voorman, D. Koulakiotis,
A.H. Aghvami, R. Prasad

**Performance Analysis of an
Adaptive MLSE Diversity Receiver
for Multiuser DS-CDMA in Fading
Channel**
M. Asvial, I. Sasase

**Linear Space Time Multi-User
Receivers for Wireless CDMA
Systems**
H. Huang, C. Papadias

B3 Wireless ATM II Chair: Dipankar Raychaudhuri

**On Scheduling of Multimedia
Services in a Low-Power MAC for
Wireless ATM Networks**
K.M. Sivalingam, J. Chen,
P. Agrawal, R. Acharya

**Guaranteed QoS Access by Packet-
by-Packet Generalized Processor
Sharing With Channel Errors and
Long Propagation**
C.-S. Chang, K.-C. Chen

Impact of Burst Errors on Framing
M. Zorzi, R.R. Rao

**A New Distributed and Dynamic
Call Admission Policy for Mobile
Wireless Networks With QoS
Guarantee**
K.-Y.M. Wong, S. Wu

**A Performance Comparison of
Media Synchronization Schemes
for Collaborative Systems in an
Interconnected ATM-Wireless LAN**
Y. Ishibashi, S. Tasaka, T. Takeo

Wireless ATM: Handover Issues
F. Jiang, T. Kakola

**Dual QoS Loading Algorithms for
Multicarrier Systems Offering
Different CBR Services**
L. Hoo, J. Tellado, J.M. Cioffi

B4 Challenges in Network Deployment Chair: Rajamani Ganesh

**Traffic Analysis of Partially
Overlaid AMPS/IS-136 Systems**
R. Ramesh, K. Balachandran

**Analysis of Diversity Performance
of Space Diversity and Cross
Polarization Diversity for PCS Base
Stations**
J. Weitzen

**Impact of Cell Size on Dual-Mode
CDMA Cellular Networks**
R. Ganesh, H. Stellas

**Deployment of Multi-Layer TDMA
Cellular Network With Distributed
Coverage for Traffic Capacity
Enhancement**
P. Charriere

**CDMA Downlink Performance
Issues**
R. Walton, M. Wallace, S. Howard

**Science, Engineering and Art of
Cellular Network Deployment**
S. Faruque

**Radio Coverage Optimization With
Genetic Algorithms**
K. Lieska, E. Laitinen



Wednesday, September 9 — Afternoon

B5 Handoff Chair: Justin Chuang	B6 ASIC Design for Wireless Applications Chair: Zoran Zvonar	B7 ACTS UMTS Chair: Jorge Pereira	B8 Geolocation for Wireless Services Chair: Joseph Pisano
Unified Handoff Control Protocol for Dynamic Path Routing in Mobile ATM Networks J. Li, D. Raychaudhuri, R. Yates A General Formula for Handoff Rate in PCS Networks Y. Fang, I. Chlamtac, Y.-B. Lin A Handoff Algorithm for Wireless Communication Systems Using Pattern Recognition Techniques R. Narasimhan, D.C. Cox Shadow Margin, Overlapping and Transceivers per Cell When Making Handovers With Hysteresis Margin A.R. Espinosa, J.P. Aspas A Stochastic Rerouting Mechanism for Handoff in Wireless ATM Networks M. Kang, M. Jung Determining Velocity Threshold for Handoff Control in Hierarchically Structured Networks J.S. Kim, W. Chung, H. Choi, J. Cheong, S. Park Handoff Protocols in JD-CDMA J. Mayer, J. Sclee, T. Weber Accurate Performance Analysis of Hard Handoff Algorithms V. Veeravalli, R. Prakash	Integrated Circuit Technology for Wireless Communications: An Overview B. Daneshrad (<i>Invited Paper</i>) Testing the Double Low-IF Receiver Architecture J. Glas, V. Bocuzzi Implementation Aspects for Noncoherent Tracking Based on a Time-Discrete Delay-Locked Loop H. Olson, H. Tenhunen Performance of Phase Locked Loop Receiver in Digital FM Systems Z. Zvonar, T. Ekvetchavit New Results on the Effects of Nonlinear Amplifiers on DQPSK and Pi/4-DQPSK Signals S. Hischke, J. Habermann Hardware Implementation Aspects of a Detector Based on Successive Interference Cancellation in a DS/CDMA System T. Olsson, C.M. Jonsson, P. Nilsson, V. Owall CCD Matched Filter in Spread Spectrum Communication E. Nishimori, C. Kimura, A. Nakagawa, K. Tsubouchi A Low Complexity Multiuser Detector for Asynchronous CDMA QPSK Systems E. Del Re	Perspectives on 3G System Development T. Ojanpera (<i>Invited Paper</i>) CDMA With Multiuser Detection Versus Coding A. Correia, F. Cercas, A. Rodrigues Interlayer Resource Management for Hierarchical Cell Structures G. Noubir Locally Centralized Dynamic Resource Allocation Algorithm for the UMTS in Manhattan Environment C. Mihailescu, X. Lagrange, P. Godlewski A Concept of Hybrid Random/ Dynamic Radio Resource Management M. Berg The RAINBOW Concept for the UMTS Access Network P. Diaz, E. Berruto A Proposal of a New MAC Layer for FMA 1 R. Prasad, L.J.M. Carrera, J. Nijhof Multiple Slot Allocation for Voice/ Data Transmission Over PRMA++ Applied to FRAMES Multiple Access Mode 1 P. Diaz, R. Ferrus	Radio Propagation Modelling for Indoor Geolocation Applications P. Krishnamurthy, K. Pahlavan, J. Beneat Time of Arrival Estimation of Narrowband TDMA Signals for Mobile Positioning H. Koorapaty, S. Fischer, A. Kangas, E. Larsson, P. Lundqvist Mobile Phone Location in Dedicated and Idle Modes M. Alanen, G. Gunnarsson A Selective Model to Suppress NLOS Signals in AOA Location Estimation L. Xiong Angular Dependency of Line-of-Sight Building Transmission Loss at 1.8 GHz H. Borjeson, B. DeBacker Direction of Arrival Determination Using 3-Axis Crossed Array R. Eckhoff System Performance of DS/SS Inter-Vehicle Communication and Ranging System Under Rician Fading Channel N. Fujimoto, M. Nakagawa Novel Generalized Optimal Fractional Delay Filter Design for Navigational Purposes A.J.R.M. Coenen



Thursday, September 10 — Morning

C1 Interference Cancellation for CDMA Systems Chair: Ryuji Kohno	C2 OFDM I Chair: Brian Woerner	C3 Multimedia Wireless Chair: Zygmunt Haas	C4 Indoor and Urban Radio Propagation Chair: Henry Bertoni
Joint Frequency Offset and Delay Profile Estimation Technique for Nonlinear Co-Channel Interference Canceller H. Murata, S. Yoshida Experiments on Coherent Multistage Interference Canceller for DS-CDMA Mobile Radio M. Sawahashi, H. Andoh, K. Higuchi, F. Adachi Optimal Linear-Quadratic Statistical Processing for Interference Cancellation in CDMA Systems A.H. Aghvami, M.R. Sheikh-Bahaei Interference and Capacity in CDMA Hybrid Systems With Hysteresis Margin A.R. Espinosa, J.P. Aspas Performance Evaluation of CDMA Adaptive Interference Canceller With RAKE Structure Using Developed Testbed in Multiuser and Multipath Fading Environment H. Mizuguchi, S. Yoshida, A. Ushirokawa Multi-Carrier CDMA System With Parallel Interference Cancellation for Multipath Fading Channels H.K. Park, E.B. Kim, Y.W. Lee, K.H. Tchah Time Varying MMSE Interference Suppression on Asynchronous DS/CDMA Systems Over Multipath Fading Channels M. Lops, S. Buzzi, A.M. Tulino Blind Multiuser Interference Cancellation in Multicarrier CDMA: A Linearly Constrained Constant Modulus Approach J. Miquez, L. Castedo	A Maximal Ratio Combining Frequency Diversity ARQ Scheme for OFDM Signals T. Kumagai, M. Mizoguchi, T. Onizawa, H. Takanashi, M. Morikura On the Optimality of Metrics for Coarse Frame Synchronization in OFDM: A Comparison S.H. Muller Maximum Likelihood Decoding of M-ary Orthogonal Modulated Signals for Multi-Carrier Spread-Spectrum Systems A. Dekorsy, S. Fischer, K.-D. Kammeyer New Algorithms for Reducing Peak to Average Power in Multicarrier Systems J. Tellado, J.M. Cioffi Analysis of Co-Channel Interference in Multicell OFDM Networks E. Geraniotis, C.-H. Yih Multicarrier Systems With Imperfect Channel Knowledge A. Leke, J.M. Cioffi Performance of Noncoherent Multiple Tone-Frequency Shift Keying Signals in Rayleigh Fading Channels With Diversity and Diversity Combining I. Ghareeb, A. Yongacoglu Generalized Analysis of Envelope Fluctuations in the Reduced Mobile Complexity OFDM Scheme S.C. Gupta, A.I. El-Arabawy	Energy-Efficient Protocols for Wireless Systems P. Agrawal (<i>Invited Paper</i>) Throughput and Delay Analysis of a Novel Slotted CDMA MAC Protocol for Multimedia Communication in Wireless LANs P.E. Omiyi, T. O'Farrell ARMAP — An Energy Conserving Protocol for Wireless Multimedia Communications P. Bahl Performance Analysis of PRMA With Integration of Voice and Buffered Data Users T. Wan, A.U. Sheikh A New Design Algorithm for Integrated Digital Communications Systems D.G. Daut, W. Ma TUTMAC: A Medium Access Control Protocol for a New Multimedia Wireless Local Area Network M. Hannikainen, J. Knuutila, A. Letonsaari, T. Hamalainen, J. Jokela, J. Ala-Laurila, J. Saarinen Reduced Complexity Maximum Likelihood Estimator for High Speed Wireless Access Y. Kakura, T. Ohsawa, K. Okanou Research on Error-Correcting Scheme of Image Transmission in Fast Fading Mobile Channel Y. Dongfeng, L. Jijun, W. Iei	Experimental Analysis of the Use of Angle of Arrival at an Adaptive Antenna Array for Location Estimation R. Owen Propagation Characteristics for Indoor Broadband Radio Access Networks in the 5 GHz Band C. Bergljung, P. Karlsson Analysis of 60 GHz Band Indoor Wireless Channels With Channel Configurations J.-H. Park, Y. Kim, Y.-S. Hur, K. Lim, K.-H. Kim Characterization of the Spatial Distribution of RMS Delay Spreads in Indoor LOS Wireless Environments at 5.2 GHz J.T.E. McDonnell, T.A. Wilkinson Indoor Radio Channel Modeling — Bridging From Propagation Details to Simulation S. Mangold, M. Lott, D. Evans, R. Fifield Modelling and Analysis of Dominant Propagation Effects in Real Indoor Environment at 5.2 GHz F. Layer, R. Kattenbach, H. Fruchting Comparison Between Two Geometric Indoor Propagation Models: Tube-Launching vs. Ray-Launching S.J. Flores, L.F. Mayorgas, F.A. Jimenez Propagation Model for Urban Micro-Cellular Systems at the UHF Band N.C. Goncalves, L.M. Correia



Thursday, September 10 — Morning

C5 Network Aspects Chair: Lin-Nan Lee	C6 Wireless Optical Networks Chair: Mahmoud Naghshineh	C7 ACTS MBS and W-LAN Chair: Joergen Bach Andersen
Microcellular Reuse Pattern in Urban Environment M.D. Yacoub, A.F. deToledo, P.R.C. Gomez, P.J.E. Jeszensky	Amplifier Linearization for LMDS Application M. Kavehrad (<i>Invited Paper</i>)	Third Generation: A Unified Architecture to Provide Mobile Multimedia J.M. Pereira (<i>Invited Paper</i>)
On Optimizing the Location Update Costs in the Presence of Database Failures Z. Haas, Y.-B. Lin	Rate Adaptive Indoor Infrared Wireless Communication Systems Using Punctured Convolutional Codes and Adaptive PPM M. Matsuo, T. Ohtsuki, I. Sasase	Design and Performance Evaluation of a Mobility Management Protocol for Wireless ATM Networks A. Kaloxylos, G. Alexiou, S. Hadjiefthymiades, L. Merakos
Prioritised Multi-Bearer Transport in DECT Systems S. Marano, A. Lera, A. Molinaro, C. Narciso	Performance Evaluation of L-PPM Links Using Repetitive Rate Coding T. Ozugur, M. Naghshineh, P. Kermani, C.M. Olsen, B. Rezvani, J.A. Copeland	Performance Evaluation of a High Frequency ATM Wireless Access System Using Directional Antennas P. Hafezi, M.A. Beach, Y. Sun, A. Nix
Design and Performance of Radio Channel Control Method for AWA Prototype H. Sato, T. Terashima, T. Okada, T. Manabe, H. Matsue	Performance of a Spread Spectrum Infrared Transmission System Under Ambient Light Interference T. O'Farrell, M. Kiatweerasakul	Signaling and IN-Based Mobility Management for Wireless ATM Access Systems N.H. Loukas, L. Merakos
Call Admission Control in DCA Wireless Network W.Y. Ming, J. Misic, S.T. Chanson	Comparison of Go-Back-N and Selective Reject ARQ Modes of HDLC Over Half-Duplex and Full-Duplex IR Links and the Effects of Window Size and Processor Speed in Utilization T. Ozugur, M. Naghshineh, P. Kermani	Impact of Shaped Lens on MBS Systems J. Fernandes, C. Fernandes
Performance Analysis of Interference Adaptive Dynamic Channel Allocation in Practical TDMA/FDMA Wireless Networks S. Tekinay, Z. Xu, A.N. Akansu	A Partial-Response Precoding Scheme for Indoor Wireless Infrared Communication H. Park, J.R. Barry	Capacity Trade-Offs in Mobile Broadband Systems Using Guard Channels for High Mobility Handover F.J. Velez, L.M. Correia
Dynamic Cell-Size Control According to Geographical Mobile Distribution in a DS/CDMA Cellular System T. Togo, I. Yoshii, R. Kohnno	On the Performance of an Optical Decorrelating Receiver for Optical Orthogonal Code-Division Multiple-Access Systems Y. Cho, J.H. Lee	A DLC Layer Framework for Wireless ATM Networks N.B. Pronios, I.E. Dravopoulos, A.I. Andritsou
Aspects of Self Organisation in Cellular Networks A.G. Spilling, A.R. Nix		



Thursday, September 10 — Afternoon

D1 Performance of CDMA Networks Chair: Mohsen Kavehrad	D2 OFDM II Chair: Arthur Giordano	D3 Wireless Data Chair: Jae Hong Lee	D4 Propagation Studies I Chair: Sirin Tekinay
Performance of a Multicarrier DS/CDMA System With Adaptive Antenna Array in a Nakagami Fading Channel J.Y. Kim, J.H. Lee	A Novel Low Complexity Technique to Reduce Non-Linear Distortion Effects in OFDM Systems D. Dardari, V. Tralli, A. Vaccari	On Tractable Wireless Channel Models R. Rao (<i>Invited Paper</i>)	Evaluation of the Multipath Characteristics of the Impulse Radio Channel R.J.-M. Cramer, M.Z. Win, R.A. Scholtz
On the Capacity of Cellular CDMA Systems With Multibeam Antennas Y. Hara, R. Yonezawa, I. Chiba	Coding Techniques for Power Controlled OFDM K.G. Paterson	Channel Segregation for Slot Assignment in Integrated Voice Data Systems K. Al Agha, D. Zeghlache	Theoretical Analysis of Propagation Characteristic in Millimeter Waves Inter-Vehicle Communication System T. Wada, M. Maeda, M. Okada, K. Tsukamoto, S. Komaki
Comparing the Capacities of FH/SSMA and DS/CDMA Networks E. Geraniotis, H. El-Gamal	Coarse Frame Synchronisation for OFDM Based Wireless Communication Systems K. Bruninghaus, M. Radimirsch	Energy-Conserving Selective Repeat ARQ Protocols for Wireless Data Networks J. Redi, I. Chlamtac, C. Petrioli	Path Loss Predictions in Urban Areas Sprawling Over Irregular Terrain R. Janaswamy, J.B. Andersen
Capacity Analysis of DS-CDMA System With Beam Steering-Sectorized Antenna Over Nakagami Frequency-Selective Fading Channels J. Mar	Compensation of Non-Linear Distortion in OFDM Systems Using a New Predistorter E.J. Powers, I.-S. Park	Performance of a Multi-Rate CDMA Packet Data System R. Walton, J. Ketchum	Effects of Large Grid Size Discretization on Coverage Prediction Using the ParFlow Method J. Li, J.-F. Wagen, E. Lachat
Multi-Rate and Multi-Code CDMA Using FWT for Mobile and Personal Communications S.C. Gupta, M.F. Madkour	A Novel Method for Blind Frequency Offset Correction in an OFDM System Y. Bar-Ness, M.A. Visser, P. Zong	Optimal Forward Link Power Allocation for Data Transmission in CDMA Wireless Systems W.A. Krzymien, S. Sun, A. Jalali	Modulation, Coding, and Equalization I Chair: Vijay Bhargava
Further Insights in the Bit Error Behaviour of Coded DS/CDMA With Various Modulation Techniques D. Nikolai, K.-D. Kammeyer	Minimum Overhead Burst Transmission Using OFDM M. Speth, D. Daecke, H. Meyr	Channel Estimation Based on Pilot and DATA Traffic Channels for DS/CDMA Systems S. Min, K.B. Lee	Error Floor of Pulse Amplitude Modulation With Adaptive Sampling Phase in Time-Dispersive Fading Channels A.F. Molisch, H. Bolcskei
Performance of ODS-CDMA QPSK in a Soft Limiting AM/AM Non-Linearity Channel P.R. Pawlowski	Application of Amplitude Gain Estimation Techniques for Multilevel Modulation in OFDM Systems B.Y. Prasetyo, A.H. Aghvami	A Heuristic Algorithm for Channel Allocation of Multi-Rate Data in Hybrid TDMA/FDMA Digital Cellular Systems W.-L. Wan, W.-S. Wong	Pilot Symbol Assisted Modulation Using Encoder Tail Bits Y.G. Kang
		Hybrid Channel Assignment for Integrated Voice/Data Traffic in DS-CDMA Networks J.H. Kim, T.S. Kim, Y.W. Kim, D.K. Sung	Combined MLSE/Symbol Based Demodulation Scheme for Fading Channels With and Without Delay Spread W. Sung, I.-K. Kim
			Achieving MAI Cancellation in an Asynchronous DS/CDMA System by Optimum Detection N.R. Patel, T. O'Farrell



Thursday, September 10 — Afternoon

D5 Power Control

Chair: John Rulnick

Power Control for Wireless Data Based on Utility and Pricing
D. Goodman (*Invited Paper*)

Enhancing Network Quality Using Frequency Hopping, Downlink Power Control and DTX in Live GSM Network
T.T. Nielsen, J. Wigard, S. Skjarris, C.O. Jensen, J. Elling

Power Control in Cellular Radio Systems With Down-Link Multicast Traffic
C.G. Lof

SIR-Balanced Macro Power Control for CDMA Sectorized Distributed Antenna Systems
H. Yanikomeroglu, E. Sousa

Power Control and Sector Antennas for Improved DS/SS Inter-Vehicle Communication
L.B. Michael, M. Nakagawa

Adaptive Closed Loop Power Control With Quantized Feedback and Loop Filtering
E. Geraniotis, H.-J. Su

Performance Evaluation of DS/CDMA Systems Employing Adaptive Transmission Rate Under Imperfect Power Control
E. Sousa, B. Hashem

Selecting the Feedback Rate for SIR-Based Power Control in Wireless TDMA Networks With Slowly Moving Terminals
E. Anderlind

D6 Smart Antennas

Chair: Ahmad Bahai

Forward Link Capacity in Smart Antenna Basestations With Dynamic Slot Allocation
T.D. Todd, R. Sinha, F. Shad, V. Kezys

A Novel IS-95 CDMA Mobile Station Receiver Structure With Smart Antenna Canceller
Y. Bar-Ness, W. Ye, A.M. Haimovich

Smart Antenna Testbed for High Speed Wireless Communications
F. Chin, M. Chia

Modelling and Simulating Fading Channels for Systems With Smart Antennas
J. Baltersee

The Benefits of Intelligent Antenna Arrays in TD-CDMA — A Study Based on Measured Channel Impulse Responses
M. Weckerle, A. Papathanassiou, D. Emmer

Signal Processing Improvements for Smart Antenna Signals in IS-95 CDMA
S. Affes, P. Mermelstein

MAC Layer Performance With Steerable Multibeam Antenna Arrays in Wireless Communications
R.R. Rao, A. Chockalingam

D7 ACTS System Aspects

Chair: Pilar Diaz

UMTS: Development of Standards for the Third Generation
A. Samukic (*Invited Paper*)

Advanced End-to-End Broadband and Ubiquitous Mobile Satellite Service Demonstration Using Ka Band Technology
G. Losquadro, M. Barbieri

Inter-Segment Handover Algorithm for an Integrated Terrestrial/Satellite-UMTS Environment
N. Efthymiou, Y.F. Hu, A. Properzi, R.E. Sheriff

The TOMAS Satellite-UMTS Inter-Trial Platform
A. Schubert, A. Timm

System Demonstrator for the MOSTRAIN (Mobile Services for High Speed Trains) Project
J. Irvine, D. Robertson, J. Dunlop

Network Planning Methodology Applied to the UTRA Specifications
J.G. Markoulidakis, R. Menolascino, F. Galliano, M. Pizarroso

A Simple Algorithm to Distribute Optimally a Number of External Base Stations in a Microcellular Environment
R.A. Comes, X.M. Querol, J.P. Romero

A New Approach to UMTS Requirements in the CTDMA Radio Interface
V.N. Kurskii, V.V. Proklov, A.F. Markin



Friday, September 11 — Morning

E1 CDMA I	E2 Modulation, Coding, and Equalization II	E3 Medium Access Methods I	E4 Propagation Studies II
Chair: John Orr	Chair: John Proakis	Chair: Prathima Agrawal	Chair: Seiichi Sampei
Uplink System Performance of High Speed IS-95 CDMA With Mixed Voice and Bursty Data Traffic M. Cheng, L.-F. Chang	A Simple and Accurate Analysis of Digital Communication Systems With Diversity Reception in Different Fading Environments V. Bhargava (<i>Invited Paper</i>)	Analysis of a Novel Feedback Scheme to Increase Throughput in Multiple Access Radio Systems R.O. Lemaire, A. Krishna	Frequency-Domain Simulation of the MM-Wave Multipath Fading Radio Channel Applying the Hilbert Transform K. Witrisal, Y.-H. Kim, R. Prasad
Other Cell Interference and Capacity of Power Controlled CDMA in Wireless Fixed Access Networks H. Stellas, A. Giordano, A. Asku, W. Biagini	Performance of Real-Time Video Transmission Using Error Control Over Rayleigh and Rician Fading Channels N. Matoba, Y. Kondo, T. Tanaka	Energy Efficiency Analysis of a Multichannel Wireless Access Protocol L.B. Milstein, A. Chockalingam, W. Xu, M. Zorzi	Outage Analysis of Cellular Systems in an Arbitrary Log Normal Shadowed Rician Environment Q.T. Zhang
CDMA Reverse Link Capacity in a Manhattan Like Microcellular System D.L. Rodriguez, F.A. Cruz-Perez	A Study on Iterative Decoding Techniques Applied to GSM Full-Rate Channels F. Jordan, K.-D. Kammeyer	Capacity of S-ALOHA Protocols Using a Smart Antenna at the Base Station F. Shad, T.D. Todd	An Experimental Performance Comparison Between Antenna Diversity Schemes at 1800 MHz F. Aanvik, E. Antonsen, M. Pettersen
Using Higher Order Constellation With Minimum Mean Square Error Receiver for Severe Multipath CDMA Channel L.B. Milstein, P. Shamain	Three Dimensional Regression Polynomial Coding for Video Transmission Y.-J. Lan, A.-Y. Cen, J.-L. Lin, K.-A. Wen	Reservation Code Multiple Access With Control Code for Voice Terminal O. Arakawa, T. Kobayashi	Coverage Prediction for Cellular Networks From Limited Signal Strength Measurements M. Kanagalu, P. Bernardin, L. Tamil
Learning Algorithms for Blind Deconvolution in CDMA Downlink J. Joutsalo, T. Ristaniemi	Adaptive Equalizer Including Frequency-Offset Compensator N. Kataoka, R. Kohn	Robust Broadcast: Improving the Reliability of Broadcast Transmissions on CSMA/CA J. Tourrilhes	Propagation Studies of Ka-Band Wavebeams of Broadband Wireless Systems S.A. Ogarev, G.A. Andreyev
Approximation of an Integrated CDMA System M.Y. Watson, T.L. Mitchell	Reduced Rand Equalization E. Lindskog, C. Tidestav	Spatial Distribution Analysis With Capture Effect of a Mobile S-ALOHA Network D.C. Rosales, S. Ruiz, J. Huguet, J. Olomos	Propagation Measurements and Modeling in Jinan City D. Yuan, J. Wu
Effects of Downlink Intercell Interference on MC-CDMA System Performance M. Nunes, J. Santos, A. Rodrigues, J. Punt, H. Nikoosar, R. Prasad	Scaling Functions and the Optimum Nyquist-Type Signaling Waveform in Digital Communications M. Liu, F. Fairman, C. Zarowski	Spectral Efficiency for FDMA and DS-SS in Cellular Systems G.S. Tombras, P. Varzakas	Correlation Model for Shadow Fading in a Small Urban Macro Cell T.B. Sorensen
		DPAP: A Dynamic Polling Based Access Protocol for Wireless Networks S. Alwakeel, M.M. Al-Fawaz	Measurements of 28 GHz Diffraction Loss by Building Corners P.A. Tenerelli, C.W. Bostian



Friday, September 11 — Morning

E5 Traffic Engineering Chair: Ramesh Rao	E6 Satellite Networks Chair: Vimal Dubey	E7 ACTS Enabling Technologies Chair: Ramjee Prasad
Traffic Engineering for the Wireless LAN Access Point K. Pahlavan, A. Zahedi	Maximum Likelihood Acquisition of Time and Frequency Shift in Land Mobile DS-CDMA System G. Wetzker, F. Jondral	A Multimedia Communication Architecture for Handheld Devices J. Meggers, A. Park, A. Fasbender, B. Kreller, L. Alonso
Performance Modeling and Analysis of Hierarchical Wireless Communications Networks With Overflow and Take-Back Traffic B. Jabbari, Y. Zhou	Exact Performance Analysis of Spread Spectrum Satellite Networks A.-G. Daraiseh, S. Almadi, M.A. Rowily	Equalization of Satellite UMTS Channels Using RBF Networks S. Bouchired, M. Ibnkahla, D. Roviras, F. Castanie
Signalling Traffic Impacts in Cordless-Cellular Integrated System S. Ghaheri-Niri, R. Tafazolli	Performance of Multi-Carrier CDMA With Iterative Detection for a Doppler Shift Channel in a LEO Mobile-Satellite Communications Environment M.S. Akhter, J. Asenstorfer	HTS — Technology for UMTS Radio Basestations H. Chaloupka, D. Jedamzik
CDMA Cell Site Optimization Using a Set-Covering Algorithm C. Yu, S. Subramanian, N. Jain	Propagation Impairment Caused by Aircraft's Flying Across the Earth-Satellite Link H. Zhang, H. Ando, R. Sato, T. Yoshino, S. Ito, Y. Nagasawa	Downlink Calibration Requirements for the TSUNAMI II Adaptive Antenna Testbed C.M. Simmonds, M.A. Beach
Validation of Models for Traffic From Mobility in Microcellular Mobile Broadband Systems F.J. Velez, L.M. Correia	TDMA Chair: Ramon Agusti	Blind Equalization Based on Spatial and Temporal Diversity in Block-Coded Modulations F. Rey, M. Lamarca, G. Vazquez
Battery Consumption and Handoff Examination of a Cellular Ad-Hoc United Communication System for Operational Mobile Robots M. Nakagawa, T. Adachi	Evaluation of Techniques for Cochannel Interference Cancellation in TDMA Communication Systems N. Georganopoulos, A.H. Aghvami	Optimal Array Combiner for Sequence Detectors in Mobile Radio Channels J. Vidal, M.A. Lagunas, A.I. Perez-Neira, J.R. Fonollosa
Cellular Planning Optimisation for Non-Uniform Traffic Distributions L. Santos, L.S. Ferreira, V. Garcia, L.M. Correia	CHOS Based Channel Tracking in Cellular TDMA Communications M. Martone	High Gain Antennas in a Random Environment J.B. Andersen
Traffic Controlled Spatial Reuse TDMA in Multihop Radio Networks J. Gronkvist	CFAR TDMA Burst Detection Schemes for Constant Modulus Signals I.-K. Kim, W. Sung	
	Capacity of TDMA Cellular Systems With Slow Rayleigh Fading Counter-Measures D.A.J. Pearce, A.G. Burr, T.C. Tozer	



Friday, September 11 — Afternoon

F1 CDMA II	F2 Modulation, Coding, and Equalization III	F3 Medium Access Methods II	F4 Antenna Systems
Chair: Pentti Leppanen	Chair: Khaled Ben Letaief	Chair: Kwang Cheng Chen	Chair: Yeheskel Bar-Ness
Non-Linear Power Control in Multimedia CDMA Wireless Network P.R. Larijani, J.W. Chinneck, R.H. Hafez	DC Offset Canceller in a Direct Conversion Receiver for QPSK Signal Reception H. Yoshida, H. Tsurumi, Y. Suzuki	Guaranteed QoS Wireless Access to Broadband Networks K.-C. Chen (<i>Invited Paper</i>)	Adaptive Multistage Beamforming of Cellular Signals Using Cyclic Higher Order Statistics M. Martone
A Dynamic Load Sharing Algorithm Through Power Control in Cellular CDMA J.W. Mark, J.X. Qiu	Frequency Stabilized Direct GMSK Modulator D.M. Klymyshyn, S. Kumar, A. Mohammadi	An Efficient Media Access Protocol for Delay Sensitive Bursty Data in Broadband Wireless Networks J. Jiang, T.-H. Lai	Transmit Antenna Array Techniques for Cellular CDMA Systems F. Chin, Y.-C. Liang
Performance Study of the Adaptive MMSE Maximum Likelihood CDMA Receiver P.B. Rapajic, D.K. Borah	Analysis of 16 QAM Over a Non-Linear Channel G. Chrisikos	A New Digital Sense Multiple Access (DSMA) Protocol for High Speed Networks K.K. Leung, J.-M. Ho, H. Chien	A Controlled Distributed Antenna System for Increased Capacity in DS-CDMA J.H. Lee, J.H. Roh, J.H. Kwan, C.-E. Kang
A Simple and Accurate Analysis Method of SIC Performance Using Spatial Cell Modeling in DS/CDMA System K.S. Kim, C.S. Kang	Successive-Erasure Decoding of RS Codes and Error Detection for ARQ F. Poegel, A. Finger	A Low Delay Algorithm for the Multiple Access Channel With Rayleigh Fading I. Bettesh, S. Shamai	Maximum Likelihood Multipath Channel Parameter Estimation in CDMA Systems Using Antenna Arrays C. Sengupta, J.R. Cavallaro, B. Aazhang
MPEG-4: A Flexible Coding Standard for the Emerging Mobile Multimedia Applications L.D. Soares, F. Pereira	A Novel and Effective Solution to Block-Based Joint-Detection Using Approximate Cholesky Factorization H.R. Karimi	Two Medium Access Control Schemes for DS-CDMA Personal Communication Networks J. He, M.T. Liu	Validation of High Resolution Channel Parameter Measurements M. Tschudin, R. Heddergott, P. Truffer
Performance Analysis of a New Channel Estimator for Fast Fading and High Frequency Offset in DS-CDMA/QPSK S. Ko, K. Lee, H. Choi	The Performance of TCM 16-QAM With Equalization, Diversity and Slow Frequency Hopping for Wideband Mobile Communications J. Wu	Performance Analysis of Multi-Code Slotted Spread ALOHA (MCSSA) System: Finite and Infinite Population S. Dastangoo, S. Resheff, B. Vojcic	An Adaptive Array Antenna Using Combined DFT and LMS Algorithms K. Watanabe, I. Yoshii, R. Kohno
Iterative Decoding and Channel Estimation of DS/CDMA Over Slow Rayleigh Fading Channels E. Geraniotis, H. El Gamal, M.M. Khairy	Modified Multi-Rate Multi-User Detection for Frequency Selective Rayleigh Fading CDMA Channels J. Ma, H. Ge	Iterative Soft Onion Peeling for Multi-Access and Broadcast Channels N. Chayat	The Problems of Implementing Adaptive Array Antennas in CDMA Systems A. Morimoto, T. Yamazato, A. Ogawa
On the Performance of Adaptive MMSE Detectors for a MC-CDMA System in Fast Fading Rayleigh Channels D.N. Kalofonos, M. Stojanovic, J. Proakis			



Friday, September 11 — Afternoon

F5 Resources Management Techniques Chair: Allen Levesque	F6 Spread Spectrum Chair: Takis Mathiopoulos	F7 GSM Chair: Juha Rapeli	F8 Security and Privacy Chair: Christof Paar
Dynamic Resource Allocation With Interference Avoidance for Fixed Wireless Systems X. Qiu, K. Chawla AWA System With Autonomous Resource Assignment M.A. Haleem, R. Valenzuela G-CBWL: A Dynamic Frequency Allocation Technique Suitable for GSM M. Scheibenbogen, P. Seidenberg, M.P. Althoff Enhanced Dynamic Radio Resource Allocation Performance Using a Gradient Descent Algorithm W.A. Egner, V.K. Prabhu Performance Evaluation of Adaptive Zone Configuration System A. Kanazawa, N. Ichikawa, H. Harada, N. Tsuzuki, T. Iwama Performance of a Distributed Coverage SFH-TDMA System With Mobility Management in a High Density Traffic Network A. Wautier, J. Antonine, J. Brouet, V. Kumar Wireless Resources Management Using Virtual Class Concept E.-J. Ha, J.-T. Park	Performance Analysis of Wireless Ad Hoc Networks Based on mMFSK Frequency Hopping Modulation S.G. Glisic (<i>Invited Paper</i>) Linear Timing Acquisition Scheme in DS-CDMA Communication System C.-M. Chang, K.-C. Chen CDMA Downlink Code Acquisition Performance in Frequency-Selective Fading Channels M. Latva-Aho A Predistorter for Nonlinear Distortion in Multi-Code CDMA Systems K.-S. Jin, Y. Shin, S. Im An Adaptive Filtering PN Code Acquisition Scheme With Improved Acquisition Based Capacity in DS/CDMA M. El-Tarhuni, A. Sheikh Innovative Coding Scheme for Spread-Spectrum Communications V. Sorokine, F.R. Kschischang, S. Pasupathy Near-Far Resistant Detection of Symbol and Chip-Timing Error in Asynchronous DS/CDMA Communication System S.-H. Yoon, D.-S. Hong Matched Filter Acquisition in Fixed Multipath Channels J. Linatti, M. Latva-Aho	A Comparison of GSM Receivers for Fading Multipath Channels With Adjacent and Cochannel Interference B.A. Bjerke, J. Proakis, M.K. Lee, Z. Zvonar Analysis of GSM HSCSD Service With Channel Allocation Constraints D. Calin, D. Zeghlache Speech Quality Based Performance Evaluation of a Partially Loaded GSM System A. Arregui, J. Dunlop On the Transmission of ATM Traffic in Wide Area Cellular Networks J. Dunlop, A. Arregui An Analysis of Fixed Wireless Network Interconnect Costs R. Stanley, S. Resheff Interference Analysis of a Total Frequency Hopping GSM Cordless Telephony System J. DeiBner, A.N. Barreto, U. Barth, G. Fettweis Bit Error Rate Based Link Adaptation for GSM J. Pons, J. Dunlop Capacity and Speech Quality Aspects Using Adaptive Multi-Rate (AMR) O. Corbun, M. Almgren, K. Svanbro	Security Design for a New Wireless Local Area Network TUTWLAN K.-T. Salli, T. Hamalainen, J. Knuutila, J. Saarinen A Distributed Intelligent Agent Approach for Fraud Detection in Personal Communication Systems M. Toloo, S. Abu-Hakima Security System for Wireless Local Area Networks L. Korba Security Issues for Wireless ATM Networks D. Patiyooot, S.J. Shepherd PCS Systems Chair: Samuel Resheff Grouping Cells in PCS Networks E. Cayirci, C. Ersoy Optimization Approach to Prioritized Transmitter Removal in a Multiservice Cellular PCS S.-L. Kim Personal Computing and Communication — A Swedish Strategic Research Program B.-A. Molin



Notes

Communications for Mobile Life in the Third Millennium



<http://www.pimrc98.wpi.edu>

General Chair: Dennis F. Strigl, President and CEO—Bell Atlantic Mobile
Organizer and Technical Program Chair: Kaveh Pahlavan—Worcester Polytechnic Institute

©Bell Atlantic Mobile



 ANALOG
DEVICES

