Hindawi Publishing Corporation
EURASIP Journal on Wireless Communications and Networking
Volume 2007, Article ID 24595, 2 pages
doi:10.1155/2007/24595

Editorial

Space-Time Channel Modeling for Wireless Communications

Thushara Abhayapala,[1] Mérouane Debbah,[2] and Rodney A. Kennedy[3]

[1] *Research School of Information Sciences and Engineering, The Australian National University, Canberra, ACT 0200, Australia*
[2] *Mobile Communications Department, Eurécom Institute, 2229 Route des Crêtes, 06904 Sophia Antipolis, France*
[3] *Wireless Signal Processing Program, National ICT Australia (NICTA), Canberra, ACT 2601, Australia*

Received 12 December 2007; Accepted 12 December 2007

Copyright © 2007 Thushara Abhayapala et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

The relatively recent surge in activity centered around multiple-input multiple-output (MIMO) techniques for wireless communications is based on capacity gains obtained by more fully exploiting the spatial and temporal aspects of wireless channels. The early indications moving to the use of multiple transmitters and multiple receiver elements could lead to quite significant performance improvements that were based on theoretical studies which made quite idealistic simplifying assumptions about the MIMO channel. Although an understanding of the likely channel models to be found in practice was incomplete, even a modest portion of the promised MIMO gains would lead to significant performance improvements. This has been manifested by the successful deployment of new wireless standards that have MIMO products alreadyin the marketplace. Although theoretical studies can well define theupper limits to the capacity gains of MIMO, it is of interest to know how much of that limiting performance can be obtained under realistic channel conditions. This naturally leads to two classes of investigation: significant measurement studies of using MIMO in different real environments and development of more refined theoretical models that incorporate, in their structural aspects, what is either observed in practice or expected in practice. This highlights the important ongoing role that research into space-time channel modeling plays in understanding what is practicallyachievable by MIMO techniques.

The goal of this special issue was to present recent results in space-time channel models which more realistically capture what is found in practice. The papers to be found in this issue certainly advance that goal. This special issue collects eight papers clustered into two groups: papers dealing with the capture and analysis of channel measurements and papers dealing with theoretical models.

The first paper by L. Garcia et al. considers measurements of an indoor and an outdoor wireless channel at 1800 MHz to guide the selection of the most effective MIMO configuration particular focusing on spatially configuring two transmitters, in a 2×4 configuration, to approach the performance of a 4×4 configuration. Path loss and spatial correlation properties for the different configurations are analyzed.

The paper by A. Pal et al. evaluates three candidate antenna array designs for wideband MIMO at a center frequency of 5.2 GHz where the application is in small devices such as personal digital assistants, mobile phones, and laptops. The wideband MIMO measurements in an open-plan office environment are compared with results from channel models which combine measured far field radiation patterns of the antenna elements with the spatial-temporal multipath parameters of the channel using a ray tracing model. The diversity in polarization, space, and angle are considered.

The third paper by H. Suzuki et al. considers indoor measurements of a 4×4 MIMO-OFDM channel operating at 5.25 GHz with bandwidth of 40 MHz corresponding to the maximum data rate configuration for the IEEE 802.11n standard. The measurements are done in line-of-sight and non-line-of-sight-cases. These measurements form the basis of a critical review of the validity of proposed correlation channel models.

The fourth and final paper in the first group, which considers measurement, is the paper by M. Landmann et al. This paper considers the polarization behavior of mobile radio channel in a macrocell rural environment. The emphasis is on modeling changing and transient propagation

phenomena which are overlooked in available channel models. The polarization behaviour is analyzed by separating the effects due to specular reflections from the diffuse multipath components.

The second group of papers deals with modeling aspects and not directly with measurements. As with measurements, the emphasis is to find MIMO models which properly capture the appropriate wireless environments.

The first paper in the second group of papers is by P. Almers et al. It is an up-to-date survey of radio propagation and channel models used to emulate wireless channels for MIMO systems. A distinction is drawn between two classes: models that bundle the antenna configuration with the propagation and those that just treat the channel propagation independent of the antenna configuration. The paper provides a critical analysis which highlights deficiencies in the current MIMO channel and radio propagation models including models found in wireless MIMO standards.

The second paper by J-M. Conrat and P. Pajusco presents a versatile physical channel simulator model developed by France Telecom for wideband MIMO systems. The simulator incorporates the key physical attributes: geometry, delay, directions of arrival and departure, and polarization. The model subsumes common simpler ones and has the strong advantage that permits the implementation of physical models in a link-level simulation chain. The paper also describes the software implementation and provides details of the processing time efficiency with realistic simulation configurations.

The third model paper by C-X. Wang et al. investigates the spatialtemporal correlation characteristics of the Spatial Channel Model in the Third Generation Partnership Project and the Kronecker Based Stochastic MIMO Model. The spatial temporal separability is investigated at the various levels (cluster, link, and system) for these two models. Further, the advantages and disadvantages of these models are discussed with the Spatial Channel Model being less restrictive but with greater implementation complexity. This paper also provides a very useful analysis and classification of different models which have been proposed in the literature.

The final paper by K. Popovski et al. looks at the effects multipath propagation on UWB systems and proposes a time-reversed channel impulse response strategy to implement prefiltering at the transmitter. This enables the received signal to be temporally and spatially focused at the receiver. The IEEE 802.15.3a channel model is employed and a comparison is made between time-hopped time-reversed systems and equalization RAKE-based systems.

ACKNOWLEDGMENTS

We would like to thank all researchers who submitted papers to this special issue and the large time commitments of the numerous reviewers. The revisions of the accepted papers have further enhanced the quality of the papers which should make this issue a valuable archive of material on Space-Time Channel Modeling for Wireless Communications. Finally, we would like to thank the Editorial Office of EURASIP Journal on Advances in Signal Processing and the Editor-in-Chief for the unremitting efforts to see this special issue appear in a timely fashion.

Thushara Abhayapala
Mérouane Debbah
Rodney A. Kennedy

EURASIP Journal on Advances in Signal Processing

Special Issue on Signal Processing Advances in Robots and Autonomy

Call for Papers

The capabilities of robots and autonomous systems have increased dramatically over the past years. This success story partly depends on advances in signal processing which provide appropriate and efficient analysis of sensor data and enable autonomy. A key element of the transition of signal processing output to its exploitation inside robots and autonomous systems is the way uncertainty is managed: uncertainty originating from insufficient sensor data, uncertainty about effects of future autonomous actions and, in the case of distributed sensors and actuators (like for a team of robots), uncertainty about communication lines. The aim of this special issue is to focus on recent developments that allow passing this transition path successfully, showing either where signal processing is used in robotics and autonomy or where robotics and autonomy had special demands that had not been fulfilled by signal processing before.

Topics of interest include, but are not limited to:

- Autonomous navigation:
  - Outdoor navigation using geo-information and dedicated indoor navigation solutions
  - Collision avoidance/sense and avoid
  - Dynamic feature maps, and simultaneous localization and mapping (SLAM)
- Path planning:
  - Proactive, based on open-loop optimization
  - Reactive, based on adaptive control or model predictive control (MPC)
  - Probabilistic approaches for maximizing the expected future information
- Exploration:
  - Networked teams of robots
  - Sensor networks which mix static sensors with autonomous moving ones
  - Distributed algorithms and communication aspects

The special issue will focus on the one hand on the development and comparison of algorithmic approaches and on the other hand on their currently ever-widening range of applications in any platform: underwater, surface, ground, and airborne. Special interest lies in probabilistic approaches and setups of distributed sensors and actuators.

Authors should follow the EURASIP Journal on Advances in Signal Processing manuscript format described at http://www.hindawi.com/journals/asp/. Prospective authors should submit an electronic copy of their complete manuscript through the journal Manuscript Tracking System at http://mts.hindawi.com/, according to the following timetable:

Manuscript Due	August 1, 2008
First Round of Reviews	November 1, 2008
Publication Date	February 1, 2009

Guest Editors

Frank Ehlers, NATO Undersea Research Centre (NURC), Viale S. Bartolomeo 400, 19138 La Spezia, Italy; frankehlers@ieee.org

Fredrik Gustafsson, Department of Electrical Engineering, Linköping University, 58183 Linköping, Sweden; fredrik@isy.liu.se

Matthijs Spaan, Instituto de Sistemas e Robótica, Instituto Superior Técnico, Avenue Rovisco Pais 1, 1049-001 Lisboa, Portugal; mtjspaan@isr.ist.utl.pt

EURASIP Journal on Image and Video Processing

Special Issue on Social Image and Video Content Analysis

Call for Papers

The performance of image and video analysis algorithms for content understanding has improved considerably over the last decade and their practical applications are already appearing in large-scale professional multimedia databases. However, the emergence and growing popularity of social networks and Web 2.0 applications, coupled with the ubiquity of affordable media capture, has recently stimulated huge growth in the amount of personal content available. This content brings very different challenges compared to professionally authored content: it is unstructured (i.e., it needs not conform to a generally accepted high-level syntax), typically complementary sources are available when it is captured or published, and it features the Şuser-in-the-loopŤ at all stages of the content life-cycle (capture, editing, publishing, and sharing). To date, user provided metadata, tagging, rating and so on are typically used to index content in such environments. Automated analysis has not been widely deployed yet, as research is needed to adapt existing approaches to address these new challenges.

Research directions such as multimodal fusion, collaborative computing, using location or acquisition metadata, personal and social context, tags, and other contextual information, are currently being explored in such environments. As the Web has become a massive source of multimedia content, the research community responded by developing automated methods that collect and organize ground truth collections of content, vocabularies, and so on, and similar initiatives are now required for social content. The challenge will be to demonstrate that such methods can provide a more powerful experience for the user, generate awareness, and pave the way for innovative future applications.

This issue calls for high quality, original contributions focusing on image and video analysis in large scale, distributed, social networking, and web environments. We particularly welcome papers that explore information fusion, collaborative techniques, or context analysis.

Topics of interest include, but are not limited to:

- Image and video analysis using acquisition, location, and contextual metadata
- Using collection contextual cues to constrain segmentation and classification
- Fusion of textual, audio, and numeric data in visual content analysis
- Knowledge-driven analysis and reasoning in social network environments
- Classification, structuring, and abstraction of large-scale, heterogeneous visual content
- Multimodal person detection and behavior analysis for individuals and groups
- Collaborative visual content annotation and ground truth generation using analysis tools
- User profile modeling in social network environments and personalized visual search
- Visual content analysis employing social interaction and community behavior models
- Using folksonomies, tagging, and social navigation for visual analysis

Authors should follow the EURASIP Journal on Image and Video Processing manuscript format described at http://www.hindawi.com/journals/ivp/. Prospective authors should submit an electronic copy of their complete manuscripts through the journal Manuscript Tracking System at http://mts.hindawi.com/, according to the following timetable:

Manuscript Due	June 1, 2008
First Round of Reviews	September 1, 2008
Publication Date	December 1, 2008

Guest Editors

Yannis Avrithis, National Technical University of Athens, Athens, Greece; iavr@image.ntua.gr

Yiannis Kompatsiaris, Informatics and Telematics Institute, Thermi-Thessaloniki, Greece; ikom@iti.gr

Noel O'Connor, Centre for Digital Video Processing, Dublin City University, Dublin, Ireland; oconnorn@eeng.dcu.ie

Jan Nesvadba, Philips, Eindhoven, The Netherlands; jan.nesvadba@philips.com

International Journal of Digital Multimedia Broadcasting

Special Issue on

Iterative Decoding and Cross-Layering Techniques for Multimedia Broadcasting and Communications

Call for Papers

The explosive growth of multimedia applications over the Internet and the ever-increasing users' demands over commercial terrestrial digital multimedia broadcasting all over the world call for efficient physical and cross-layer techniques able to mitigate the potential problems limiting broadband services over wireless networks. In this scenario, mobile multimedia is expected to be one of the key services of future wireless mobile networks. Meanwhile, recent advances in digital communications have paved the way to a variety of standards aimed at providing multimedia services over terrestrial broadband networks. To cite but a few, DVB-H, T-DVB, T-DMB, wireless LANs, and wireless MANs are some of the most recent standards enabling such technology.

Iterative decoding techniques for both source, channel, and joint source-channel coding and decoding and cross-layering techniques have proven to be very effective for providing a viable means of achieving capacity-approaching performance at very reduced computational burden.

The main aim of this special issue is to highlight state-of-the-art techniques on the most recent research advances enabling digital multimedia services over broadband wireless networks, focused on physical and cross-layering solutions. Novel contributions, previously unpublished, that are not being submitted to any other journal, are sought.

Topics of interests include, but are not limited to, the following subject categories:

- Iterative decoding techniques for concatenated channel codes (turbo codes and serially concatenated codes)
- Iterative decoding techniques for joint source-channel decoding
- Novel capacity-approaching channel codes: coding strategies and efficient decoding algorithms
- Cross-layer modelling/analysis and optimization techniques
- Standardization activities on digital multimedia broadcasting protocols
- Space-time coding and decoding
- Novel MIMO solutions for counteracting multipath mobile channels
- Channel estimation and equalization
- Improved channel equalization techniques for SIMO and MIMO systems
- Experimental testbeds
- Hardware Implementation and SoC solutions

Authors should follow the International Journal of Digital Multimedia Broadcasting manuscript format described at the journal site http:www.hindawi.com/journals/ijdmb/. Prospective authors should submit an electronic copy of their complete manuscript through the journal Manuscript Tracking System at http://mts.hindawi.com/, according to the following timetable:

Manuscript Due	April 1, 2008
First Round of Reviews	July 1, 2008
Publication Date	November 1, 2008

Guest Editors

Fred Daneshgaran, Department of Electrical and Computer Engineering, California State University Los Angeles, 5151 State University Drive, Los Angeles, CA 90032, USA; fdanesh@calstatela.edu

Massimiliano Laddomada, Dipartimento di Elettronica, Politecnico di Torino, Corso Duca degli Abruzzi 24, 10129 Torino, Italy; laddomada@polito.it

Marina Mondin, Dipartimento di Elettronica, Politecnico di Torino, Corso Duca degli Abruzzi 24, 10129 Torino, Italy; mondin@polito.it

EURASIP Journal on Wireless Communications and Networking

Special Issue on
Advances in Propagation Modelling for Wireless Systems

Call for Papers

The true challenge for new communication technologies is to "make the thing work" in real-world wireless channels. System designers classically focus on the impact of the radio channel on the received signals and use propagation models for testing and evaluation of receiver designs and transmission schemes. Yet, the needs for such models evolve as new applications emerge with different bandwidths, terminal mobility, higher carrier frequencies, new antennas, and so forth. Furthermore, channel characterization also yields the fundamental ties to classical electromagnetics and physics, as well as the answers to some crucial questions in communication and information theory. In particular, it is of outstanding importance for designing transmission schemes which are efficient in terms of power or spectrum management.

The objective of this special issue is to highlight the most recent advances in the area of propagation measurement and modeling. Original and research articles are solicited in all aspects of propagation, including experimental characterization, channel sounding, theoretical modeling, hardware emulation and new communication technologies.

Topics include, but are not limited to:

- 4G channel measurements and modeling
- Fixed wireless access (including outdoor-to-indoor)
- UWB propagation
- 60 GHz channel measurements and modeling
- Propagation models for wireless sensor networks, including RFIDs
- Spectrum sensing and channel prediction for cognitive radio
- Intra/inter vehicle and vehicle-to-infrastructure channel characterization
- Body area propagation modeling
- Double-directional and MIMO channels
- Multiuser MIMO channels
- Multi-hop and cooperative channels
- Polarimetric channels
- Shadowing correlation modeling
- Temporal variations in wireless channels
- Frequency and range dependence of parameters
- High-resolution algorithms for parameter extraction
- Channel prediction and tracking
- Numerical methods in wireless channel modeling
- Advances in channel emulation and sounding

Authors should follow the EURASIP Journal on Wireless Communications and Networking manuscript format described at the journal site http://www.hindawi.com/journals/wcn/. Prospective authors should submit an electronic copy of their complete manuscript through the journal Manuscript Tracking System at http://mts.hindawi.com/, according to the following timetable.

Manuscript Due	August 1, 2008
First Round of Reviews	November 1, 2008
Publication Date	February 1, 2009

Guest Editors

Claude Oestges, Microwave Laboratory, Université Catholique de Louvain,1348 Louvain-la-Neuve, Belgium; claude.oestges@uclouvain.be

Michael Jensen, Department of Electrical & Computer Engineering, Brigham Young University, Provo, UT 84602, USA; jensen@ee.byu.edu

Persefoni Kyritsi, Antennas, Propagation and Radio Networking Section, Aalborg University, 9100 Aalborg, Denmark; persa@es.aau.dk

Mansoor Shafi, Telecom New Zealand, Wellington, New Zealand; mansoor.shafi@telecom.co.nz

Jun-ichi Takada, Department of International Development Engineering, Tokyo Institute of Technology, Tokyo, Japan; takada@ide.titech.ac.jp

EURASIP Journal on Wireless Communications and Networking

Special Issue on OFDMA Architectures, Protocols, and Applications

Call for Papers

Orthogonal frequency-division multiple access (OFDMA) technologies are currently attracting intensive attention in wireless communications to meet the ever-increasing demands arising from the explosive growth of Internet, multimedia, and broadband services. OFDMA-based systems are able to deliver high data rate, operate in the hostile multipath radio environment, and allow efficient sharing of limited resources such as spectrum and transmit power between multiple users. OFDMA has been used in the mobility mode of IEEE 802.16 WiMAX, is currently a working specification in 3GPP Long Term Evolution downlink, and is the candidate access method for the IEEE 802.22 "wireless regional area networks." Clearly, recent advances in wireless communication technology have led to significant innovations that enable OFDMA-based wireless access networks to provide better quality-of-service (QoS) than ever with convenient and inexpensive deployment and mobility.

However, regardless of the technology used, OFDMA networks must not only be able to provide reliable and high quality broadband services, but also be implemented cost-effectively and be operated efficiently. OFDMA presents many of the advantages and challenges of OFDM systems for single users, and the extension to multiple users introduces many further challenges and opportunities, both on the physical layer and at higher layers. These requirements present many challenges in the design of network architectures and protocols, which have motivated a significant amount of research in the area. Also, many critical problems associated with the applications of OFDMA technologies in future wireless systems are still looking for efficient solutions. The aim of this special issue is to present a collection of high-quality research papers that report the latest research advances in this field from physical and network layers to practical applications. Original papers are solicited in all aspects of OFDMA techniques including physical layer issues, architectures, protocol designs, enabling technologies, theoretical studies, practical applications, and experimental prototypes. Topics of interest include, but are not limited to:

- Adaptive coding and modulation
- Signal processing for OFDMA
- Interference control techniques
- Bandwidth and resources allocation
- Efficient MAC protocol development
- Routing algorithms and congestion control schemes
- MAC and network layer management
- Cross-layer design and optimization
- Cooperative and game theoretic analysis
- Quality of service provisioning
- Network modeling and performance analysis
- Security and privacy management
- Broadband Wireless Access
- Testbed, experiment, implementation, standards, and practical applications

Authors should follow the EURASIP Journal on Wireless Communications and Networking manuscript format described at the journal site http://www.hindawi.com/journals/wcn/. Prospective authors should submit an electronic copy of their complete manuscript through the journal Manuscript Tracking System at http://mts.hindawi.com/, according to the following timetable.

Manuscript Due	August 1, 2008
First Round of Reviews	November 1, 2008
Publication Date	February 1, 2009

Guest Editors

Victor C.M. Leung, The University of British Columbia, 2329 West Mall Vancouver, BC, Canada, V6T 1Z4; vleung@ece.ubc.ca

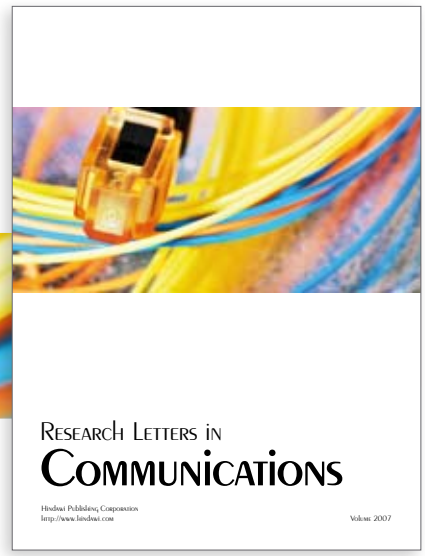
Alister G. Burr, Department of Electronics, University of York, York, YO10-5DD, UK; alister@ohm.york.ac.uk

Lingyang Song, Wireless Group, Philips Research Laboratories, Cross Oak Lane, Redhill, Surrey RH1 5HA, UK; lingyang.song@philips.com

Yan Zhang, Simula Research Laboratory, 1325 Lysaker, Norway; yanzhang@ieee.org

Thomas Michael Bohnert, Siemens AG, 80312 Munich, Germany; thomas.bohnert@siemens.com

Research Letters in Communications



Why publish in this journal?

Research Letters in Communications is devoted to very fast publication of short, high-quality manuscripts in the broad field of communications. The journal aims for a publication speed of 60 days from submission until final publication. Articles will be limited to a maximum of four published pages, and they should convey important results that have not been previously published.

Why publish in this journal?

Wide Dissemination

All articles published in the journal are freely available online with no subscription or registration barriers. Every interested reader can download, print, read, and cite your article

Quick Publication

The journal employs an online «Manuscript Tracking System» which helps streamline and speed the peer review so all manuscripts receive fast and rigorous peer review. Accepted articles appear online as soon as they are accepted, and shortly after, the final published version is released online following a thorough in-house production process.

Professional Publishing Services

The journal provides professional copyediting, typesetting, graphics, editing, and reference validation to all accepted manuscripts.

Keeping Your Copyright

Authors retain the copyright of their manuscript, which are published using the "Creative Commons Attribution License," which permits unrestricted use of all published material provided that it is properly cited.

Extensive Indexing

Articles published in this journal will be indexed in several major indexing databases to ensure the maximum possible visibility of each published article.

Submit your Manuscript Now...

Please visit the journal's website found at **http://www.hindawi.com/journals/rlc/** in order to submit your manuscript and click on the "Manuscript Submission" link in the navigational bar.

Should you need help or have any questions, please drop an email to the journal's editorial office at **rlc@hindawi.com**

ISSN: 1687-6741; e-ISSN: 1687-675X; doi:10.1155/RLC

Hindawi Publishing Corporation
410 Park Avenue, 15th Floor, #287 pmb, New York, NY 10022, USA
HINDAWI

Editor-in-Chief
Maria-Gabriella Di Benedetto
Italy

Associate Editors
Huseyin Arslan
USA
E. K. S. Au
Hong Kong
Zhi Ning Chen
Singapore
René Cumplido
Mexico
Michele Elia
Italy
Lijia Ge
China
Amoakoh Gyasi-Agyei
Australia
Peter Jung
Germany
Thomas Kaiser
Germany
Rajesh Khanna
India
David I. Laurenson
UK
Petri Mahonen
Germany
Montse Najar
Spain
Markus Rupp
Austria
Nikos C. Sagias
Greece
Theodoros Tsiftsis
Greece
Laura Vanzago
Italy
Yang Xiao
USA
Guosen Yue
USA