



mimo wireless

seminar



Theory and Applications



» OCTOBER 7th and 8th, 2004

A. BONNIN Amphitheater - INSA RENNES
RENNES / FRANCE

>> Technology Focus

Wireless access to the world-wide wire-line infrastructure and to the huge amount of information and applications on the Internet is becoming an essential feature of modern telecommunication networks. There is a strong belief that eventually in modern society most communications will be available through wireless services. The move towards "wireless everything" is being driven at full speed by users, producers of information and wireless operators. Current wireless networks are not yet ready to deliver on the promises of "wireless everything" as demanded by users as well as information providers. Significant improvements in quality of service and spectral efficiency are required to meet these ambitious goals. The use of MIMO (Multiple-Input Multiple-Output) antenna systems has widely been accepted as the key enabling technology for making the vision of "wireless everything" a reality.

>> Seminar's Objectives

This course will enable participants to

- Understand the physical principles of the MIMO radio channels
- Understand the basic principles of MIMO transceiver design and implementation
- Judge the performance gains and tradeoffs of MIMO in cellular systems
- Understand the principles of MIMO channel sounding and simulation
- Focus on some key aspects of MIMO schemes
- Focus on the Equalization process and the Beamforming techniques
- Be exposed to specific Modelling and Examples of MIMO performance
- Experience real world MIMO channels Simulation.

This seminar is a unique opportunity to blend MIMO theory, applications and practice.

>> Seminar Contents

The course starts with an introduction to MIMO wireless channels, followed by an overview of the fundamental performance limits of MIMO wireless. MIMO transceiver design and implementation as well as the corresponding signal processing techniques are discussed. This is followed by a presentation of the basic principles of a MIMO cellular system and a discussion of MIMO gains from a systems perspective.

Then, during the following day, the various R&D aspects on MIMO techniques (algorithms, ST coding, system architectures, beamforming, channel characterization and modelling, etc.) will be presented.

Finally, hardware demonstrations illustrate the principles of MIMO channel sounding and simulation.

>> Who should attend

The seminar is intended for post-graduate students, researchers, systems engineers, hardware and software designers, R&D managers who seek an understanding of current streams and evolving directions for wireless access networks. The seminar deals with basic wireless communications issues and the enabling technologies. As such, no specific background is required, although some generic knowledge of telecommunications and electrical engineering is helpful.

>> Seminar's material

The participants will be provided with a detailed set of lecture notes (... slides), which will be distributed upon arrival to the seminar's site. The notes will not be for sale outside the seminar.

» PROGRAM

» October 7

9H30	Reception / Welcome by Ghaïs El Zein, IETR and Michel Thurel, Elektrobit
9H45 - 11H15	<i>Wireless Channels, Fading, Diversity, Channel models</i> Helmüt Bölcskel, ETH Zurich
11H15 - 11H30	Coffee Break
11H30 - 12H30	<i>MIMO Channel Capacity 1</i> Helmüt Bölcskel, ETH Zurich
12H30 - 14H00	Lunch Break
14H00 - 16H00	<i>MIMO Channel Capacity 2, MIMO Receivers for spatial Multiplexing and their Information-Theoretic Performance</i> Helmüt Bölcskel, ETH Zurich
16H00 - 16H15	Coffee Break
16H15 - 17H15	<i>Space-Time coding</i> Helmüt Bölcskel, ETH Zurich
16H45 - 17H15	<i>Space-Frequency Coding</i> Helmüt Bölcskel, ETH Zurich
17H15 - 17H30	Break
17H30 - 18H00	Discussion - Synthesis
18H00	Cocktail

» October 8

8H30 - 9H00	Reception
9H00 - 9H30	<i>Comparison of Different MIMO Schemes for Multicarrier systems,</i> Maryline Héliard, FT R&D
9H30 - 10H00	<i>Equalization for Orthogonal Space Time Block Codes,</i> Karline Amis, ENST Bretagne
10H00 - 10H30	<i>Beamforming Techniques : Application to UMTS TDD,</i> Jean-François Diouris - Guillaume Andrieux, IREENA
10H30 - 10H45	Coffee Break
10H45 - 11H15	<i>Characterization and Modelling of the MIMO Channel,</i> Ghaïs El Zein, IETR
11H15 - 11H45	<i>Examples of Expected MIMO Performances : Ideal World versus Real Environment,</i> Martine Liénard, TELICE/IEMN
11H45 - 12H30	<i>Cellular MIMO systems</i> Helmüt Bölcskel, ETH Zurich
12H30 - 14H00	Lunch Break
14H00 - 15H00	<i>A Real-Time MIMO-OFDM Testbed</i> Helmüt Bölcskel, ETH Zurich
15H00 - 16H00	Discussion - Synthesis
16H00	Coffee Break

PLACE

INSA - A.Bonnin Amphitheater - 20, Avenue des Buttes de Coësmes - 35043 RENNES

REGISTRATION

Please fill in the enclosed document and send or fax (33 2 98 10 3132) to :
Elektrobit SAS, 4 rue Bernard Guillemot - 29000 QUIMPER

SEMINAR'S FEES

- 300 Euros for the 2 days.
This includes : ♦ Seminar's documents
♦ Refreshments and Lunches for the 2 days
- Special Fee for Students only at 100 Euros. Attendance limited to 20 students.

CONTACTS

- Seminar's contents :
Ghais El Zein 33 223 23 86 04 - ghais.el-zein@insa-rennes.fr
Jean-François Helard 33 223 23 86 84 - jean-francois.helard@insa-rennes.fr
- Logistics and Registration :
Michel Thurel 33 298 10 31 30 - michel.thurel@elektrobit.com

SOME HOTEL ADDRESSES

www.renneshotelreservation.com

- Situated 100m from INSA : Hotel Campanile Rennes Nord Est Atalante
- City center : ♦ Inter Hotel Le Sevigne
♦ Mercure Rennes Colombier et Mercure Rennes Pré-Botté

HOW TO ACCESS INSA

<http://www.insa-rennes.fr/presentation/acces.html>

While arriving by the by-pass of Rennes : Follow the Plan beside.

- By southern by-pass : take direction to Rennes Centre - Cesson Ouest
- By northern by-pass : take direction 15 "porte des Longs Champs"
(Rennes Centre - Cesson Nord)

Coming from the airport of RENNES St-JACQUES you can take a taxi.
From Monday to Friday 3 daily flights coming from Paris-orly
and 2 daily flights from Paris-Roissy 1.
3 daily direct flights coming from LYON.

- By the train : Either take a taxi for the INSA de RENNES BEAULIEU
or take the bus : follow the Janvier avenue (600 meters) until the Vilaine river,
at the bus stop PASTEUR take bus n°16 to INSA.

