

Title: Information Theory and Wireless Channel Modelling
Speaker: Merouane Debbah
Duration: Half Day (3 hours)
Affiliation: Supelec, Plateau de Moulon, 91192 Gif-sur-Yvette Cedex, France

Rationale: the overall objective of the tutorial:

The tutorial presents an in-depth introduction to recent results on channel modelling (Single Input Single Output as well as Multiple Input Multiple Output channels). A unifying approach, based on the principle of Maximum Entropy, is provided to construct consistent channel models: the consistency argument is at the heart of scientific inference and gives an explicit answer to the problem posed by the striking number of papers dedicated to channel models. Indeed, nearly all the models proposed are different and moreover validated by measurement campaigns! Who should we trust?

This tutorial aims at providing some partial answers to this question by combining the influence of three fields namely Information theory, Communication theory and Bayesian probability theory.

The first part of the tutorial is dedicated to information theoretic considerations and the logic of plausible reasoning whereas the second part applies these tools for model construction of wireless channels. Information theoretic considerations of established wireless channel models are also provided. Finally, the third part is dedicated to the issue of model validation and practical examples based on measurements at 2.1 GHz and 5 GHz illustrate the framework. The tutorial is self contained and requires no a priori knowledge in the field.

Biography of the speakers

Prof. Merouane Debbah was born in Madrid, Spain. He entered the Ecole Normale Supérieure de Cachan (France) in 1996 where he received the M.Sc and the Ph.D. degrees respectively in 1999 and 2002. From 1999 to 2002, he worked for Motorola Labs on Wireless Local Area Networks and prospective fourth generation systems (OFDM and MC-CDMA). From 2002 until 2003, he was appointed Senior Researcher at the Vienna Research Center for Telecommunications (ftw.), Vienna, Austria working on MIMO wireless channel modeling issues. From 2003 until 2007, he joined the Mobile Communications department of the Institute Eurecom (Sophia Antipolis, France) as an Assistant Professor. He is presently a full Professor at Supelec (Gif-sur-Yvette, France), holder of the Alcatel-Lucent Chair on "flexible radio". His research interests are in information theory, signal processing and wireless communications. Merouane Debbah serves on the editorial board of the Springer wireless network journal. He is technical chair of RAWNET 2007, the 2007 Winter School on Information Theory and Wi-Opt 2008.