

# Séminaire ICI : Leszek Szczecinski

28 Juin 2016, 14:30 – 16:00

## Titre du séminaire et orateur

How to Boost the Throughput of HARQ with Off-the-Shelf Codes.

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## Date et lieu

Mardi 28 juin 2016, 14h30.

ENSEA, salle 384.

## Abstract

In this talk we discuss the coding strategies which enhance the throughput of hybrid ARQ (HARQ) transmission over i.i.d. block-fading channels. We consider the "canonical" scenario where the channel state information (CSI) is unknown at the transmitter and we focus on the high-SNR range. In these conditions, the conventional HARQ which reserves various channel blocks to carry the coded versions of the same packet, is useless from the throughput point of view. We thus apply a multi-packet coding where the channel block may be shared among many packets.

We explain a simplified two-layer encoding/decoding where, first, packets are coded with the binary compressing encoders, and the results are then passed to the conventional channel encoder. This approach allows us to use off-the-shelf decoders and to find the compression rates which maximize the total throughput.

We also discuss how the parameters of practical turbo-encoders should be modified to take advantage of the proposed HARQ scheme. Numerical examples are shown where, comparing to the conventional incremental redundancy HARQ (IR-HARQ), multi-packet HARQ yields notable gains in the region of high throughput, where the conventional IR-HARQ fails to provide any improvement.

## Bio

Leszek Szczecinski is Professor at INRS, University of Quebec, Canada and Adjunct Professor at ECE Department of McGill University. He obtained M.Eng. degree from the Technical University of Warsaw in 1992, and Ph.D. from INRS-Telecommunications, Montreal in 1997. From 1998 to 2001, he held position of Assistant Professor at the Department of Electrical Engineering, University of Chile. In 2009-2010, as a Marie Curie Research Fellow, he was with CNRS, L2S, Gif-sur-Yvette, France. His

research interests are in the area of communication theory, modulation and coding, ARQ, wireless communications, and digital signal processing. He coauthors a book "Bit-Interleaved Coded Modulation: Fundamental, Analysis and Design" (Wiley, 2015).