

# Journée scientifique

## Jeudi 9 décembre 2021

Amphi DARWIN

**9h15**

**Accueil et présentation de la journée**

Par Anissa MOKRAOUI

**9h30-10h10 (40 minutes)**

**Are the voxels more difficult to compress than the pixels?**

Par Marius PREDA

Telecom SudParis,  
Equipe ARTEMIS

**10h10-10h40 (30 minutes)**

**Location Privacy and Security in Vehicular Networks**

Par Saadi BOUDJIT

Equipe « réseau »

**10h-40-11h10 (30 minutes)**

**Extensions de Champs Browniens Fractionnaires et Analyse Spectrale  
Morphologique pour la Discrimination des Catalyseurs**

Par Zhangyun TAN

ATER, équipe « multimédia »

**11h10-11h30 : Pause café**

**11h30-11h50 (20 minutes)**

**Optimized Scheduling for Service Differential 5G/6G Fronthaul Network Traffic**

Par Ogechi AKUDO

Doctorante équipe « réseau »

**11h50-12h20**

**Présentation des doctorants**

(10 minutes suivies de 5 minutes de questions)

**Codage vidéo : Réduction de la redondance temporelle basée apprentissage profond  
pour l'optimisation du compromis débit-distorsion**

Par Bouzid AREZKI

Doctorant équipe « multimédia »

**Intelligence artificielle pour la configuration et l'achat de campagnes publicitaires  
en ligne**

Issam BENAMARA

Doctorant équipe « multimédia », The programmatic compagny

**12h20-14h00 : Pause déjeuner**

**14h00-14h40 (40 minutes)**

**The road towards 6G**

**Par Mérouane DEBBAH**

Chief Researcher, Technology Innovation Institute, Abu Dhabi

Professor at Mohamed bin Zayed University of Artificial Intelligence, Abu Dhabi.

**14h40-15h10 (30 minutes)**

**Sparse Representation Based Classification in the Wavelet Domain**

**Par Marie LUONG (Annulée)**

Equipe « multimédia »

**15h10-15h30 : Pause café**

**15h30-16h00 (30 minutes)**

**Inter-Slice Bandwidth Resource Sharing**

**Par Abdulhalim DANDOUSH**

ESME, chercheur associé au laboratoire L2TI

**16h00-16h20 (20 minutes)**

**Deep learning based image compression**

**Par Tassnim DARDOURI**

Doctorante équipe « multimédia »

**16h20**

**Clôture de la journée**

**Par Anissa MOKRAOUI**

## Résumé des exposés

### **Are the voxels more difficult to compress than the pixels?**

**Par Marius PREDA**

With the rapid growth of multimedia content, 3D objects are becoming more and more popular. They are typically modeled as complex polygonal meshes or dense point clouds, providing immersive experiences in different industrial and consumer multimedia applications. The point cloud, which is easier to acquire than mesh and is widely applicable, has raised many interests in both the academic and commercial worlds. Unfortunately, such representations require a large amount of data, not feasible for transmission on today's networks. The Moving Picture Experts Group, MPEG, as one of the main standardization groups dealing with multimedia, identified the trend and initiated recently the process of building an open standard for compactly representing 3D point clouds, considering them as the 3D equivalent of the very well-known 2D pixels. This talk introduces the main concepts of point cloud compression and the solutions retained in the development of the MPEG standardization effort.

### **Location Privacy and Security in Vehicular Networks**

**Par Saadi BOUDJIT**

The location privacy is critical and preserving it is essential. The tracking exposes the real time location, history of visited places and parsed trajectories. In vehicular networks in particular, this issue is serious because the autonomous vehicles periodically and timely transmit their locations, headings, speed and identity to neighbor vehicles and/or service infrastructures. To preserve the location privacy, various pseudonym-based approaches have been proposed in literature, mainly focusing on unlinkable pseudonym change strategies. In this work, we propose a camouflage-based solution that prevents the linkability of pseudonyms upon their update even within low density roads where the tracking chances are high. The performance of this solution has been evaluated through simulation against a global passive attacker that executes the semantic and syntactic linking attacks.

### **Extensions de Champs Browniens Fractionnaires et Analyse Spectrale Morphologique pour la Discrimination des Catalyseurs**

**Zhangyun TAN**

Cette présentation comporte 3 parties. Partie 1 commence par un bref résumé des formations suivies et expériences professionnelles, ensuite mes thèmes de recherche. Partie 2 décrit le contexte, la motivation et les contributions principales réalisées dans ma thèse. Une contribution - "Analyse ARFBF Morphologique - Application à la discrimination des phases actives du catalyseur" sera présentée en détails. Partie 3 est consacrée à la présentation de mes travaux actuels.

### **Optimized Scheduling for Service Differential 5G/6G Fronthaul Network Traffic**

**Par Ogechi AKUDO**

The need to meet the latency and reliability requirements for the diverse range of 5G and onwards traffic types, C-RAN based packet-switched networks require the added fronthaul network to be able to deliver standard bitrates. We therefore design a novel fronthaul network scheduling architecture and scheme based off the Burst Limiting Shaper (BLS) mechanism to provide Quality of Service (QoS) guarantees to service differential traffic which include ultra Reliable and Low Latency communication (URLLC) traffic and non-URLLC traffic. We therefore compare our strategy to Weighted Round Robin (WRR) scheduling algorithm under bursty and low traffic conditions. Simulations are used to evaluate our schemes performance and show how well it compares to WRR.

## The road towards 6G

Merouane DEBBAH

The standardization for 5G wireless systems is maturing and researchers around the world have already started to look at beyond the 5G systems. Although the next G gossip is at a premature stage, this talk aims to provide an overview of the vision, challenges and key enabling technologies envisioned by the wireless community. The talk will mostly focus on the fundamental technologies and will discuss potential research directions to meet the requirements of next generation wireless systems.

## Sparse Representation Based Classification in the Wavelet Domain

Par Marie LUONG

Image classification plays a key role in computer vision and machine learning, mainly because of its success in a wide range of applications including security, manufacturing, and healthcare. As classification is based on knowledge about objects and their classes, a good representation of knowledge will be the important component in a classification method. Many challenges raised in image classification are the issues of data corrupted by noises and occlusions, the lack of data or inadequate data, and the high dimensionality of data. The success of an image classification method relies on the ability of a representation learning method for effectively revealing the meaningful properties of the images. Sparse Representation is such a representation method which has achieved state-of-the-art performance in signal/ image processing. Many Sparse-Representation based Classification (SRC) methods have been proposed in spatial domain with promising results. To improve the performance and tackle the challenges previously mentioned, some classification methods based on Sparse Representation in transform domains such as Wavelet domain and Quaternion Wavelet domain will be presented in this talk demonstrating the effectiveness of the proposed methods.

## Inter-Slice Bandwidth Resource Sharing

Par Abdulhalim DANDOUSH

A network slice (NS) is an isolated end-to-end (E2E) virtual and logical network created upon a customer request to fulfil the diverse requirements of a specific business use case. A fundamental issue in network slicing is the efficient share of the underlying physical network resources between network slices. We will present a proof of concept (PoC) of the inter-slice bandwidth resources sharing, approach, so-called InterS, initially introduced by the IETF COMS information model. Thus, InterS allows a congested NS to acquire temporary or permanently (according to the sharing level) the free bandwidth resources of a neighbor slice and use them to serve its own traffic. An evaluation of the concept via realistic intensive experiments in a Software Defined Network (SDN) will be provided and discussed. Experiments have shown that InterS can significantly improve the operator's network bandwidth usage as well as the flow acceptance rates under some specific network conditions.

## Deep learning based image compression

Par Tassnim DARDOURI

In our work, we focus on a Fully Connected Network-based Lifting scheme for image coding. For this purpose, we firstly propose to opt for independent training with static and dynamic learning approaches. We then investigate an  $l_1$ -norm based loss function to promote the sparsity of the wavelet coefficients. Finally, a joint learning approach is explored to exploit the existing dependencies between the prediction filters for each level as well as the ones between different resolution levels.