**Title:** "Recent Results in Advanced Wireless Cooperative Communications"
( Roughly 60 minutes including Q&A session )

*IMT-Atlantique, Brest, Invited Professor, MATHEMATICAL AND ELECTRICAL ENGINEERING (MEE) department, COMINLabs IoTAD-CEO Project Chair*

*Professor Emeritus of JAIST, Japan, and University of Oulu, Finland*

**Abstract:** Network Information Theory is an extension of Shannon's Information Theory to Networks. We believe that the key to the successful development of *generation-less* mobile wireless communications system concepts should be to utilize the latest results of Network Information Theory in the most suitable forms, so as to satisfy network objectives and requirements in efficient way. Therefore, identifying the theoretical performance limits of such systems is of most crucial importance. Under such significant and ambitious goals and objectives, Tadashi Matsumoto has worked for almost 40 years including experiences in the industry (NTT/NTT DoCoMo), Center for Wireless Communications (University of Oulu, Finland), and JAIST. Recently, he has been intensively researching how Lossy Distributed Multi-terminal Source Coding Theory,, and especially its theoretical framework, should be modified so that it can be best-suited to mobile wireless cooperative communications systems having massive wireless devices. He also has considered how Network Information Theory should be understood in the design of wireless mesh networks, relay communications, sensor networks, Internet-of-Things (IoT) and Vehicle-to-Things (V2X) networks. His challenge has included theoretical limit analysis, algorithm design, and verification by simulations.

The reason for the pursuance towards the goals described above is that in IoT, V2X, and Edge computing, the lossless recovery of information observed by the sensing devices should not necessarily be End-to-End Lossless. In other words, the purpose of IoT network is NOT the full recovery of observations, but to make correct decisions based on the observations made by massive sensing devices which are assumed to be distributed around the target, and hence the corrected information is correlated. By utilizing the source correlation knowledge at the receiver, Ultra Reliable Low Latency Communication (URLLC) is possible, even though packet-wise transmission is lossy.

In the Seminar, the recent results of his research group are introduced, which covers performance analysis of Lossless/Lossy Multi-source transmission over fading Multiple Access Channels, such as Wyner Ziv systems over fading MAC.