

Madrid, Spain, July 26, 2017

Seminar on OTFS technology by Dr. Christian Ibars

5TONIC is proud to have hosted a seminar by one its members, **Cohere Technologies**, represented by Dr. Christian Ibars.

The seminar, that was imparted to IMDEA Networks researchers as well as personnel from the NETCOM research group at University Carlos III, was titled “**OTFS: A New Generation of Modulation Addressing the Challenges of 5G**”. In it, Dr. Ibars introduced a new two-dimensional modulation technique called Orthogonal Time Frequency Space (OTFS) modulation, designed in the delay-Doppler domain as a waveform ideally suited to new 5G use cases. Through this design, which exploits full diversity over time and frequency, OTFS coupled with equalization, converts the fading, time-varying wireless channel experienced by modulated signals such as OFDM into a time-independent channel with a complex channel gain that is roughly constant for all symbols. Thus, transmitter adaptation is not needed. This extraction of the full channel diversity allows OTFS to greatly simplify system operation and significantly improves performance, particularly in systems with high Doppler, short packets, and large antenna arrays. During the second half of the year, 5TONIC will test OTFS technology in cooperation with Cohere, Telefónica, and IMDEA Networks, focusing on its potential application for fixed wireless access and ultra reliable communications 5G use cases.

Christian Ibars Casas is currently a Principal Engineer at Cohere Technologies, based in Santa Clara, CA, USA. Formerly, he was with the Next Generation Networks group at Intel Corporation, USA (2013-2016), and with the Centre Tecnologic de Telecomunicacions de Catalunya, Spain (2003-2013), as head of the Communications Systems Division and other positions. He has also held external lecturer appointments at Universitat Pompeu Fabra during 2006-2008, and several visiting appointments (visiting student at Stanford University, 2000, visiting scholar at Cisco Research Center, 2010, and Marie Curie Fellow at the University of Padova (2010-2011)). During his career, Christian has specialized in wireless communications systems, with a recent focus on 5th Generation cellular systems. He participates in the standardization process of 3GPP since Release 13. He also participated in several projects funded by the European Commission, European Space Agency, Spanish Government, and US National Science Foundation, such as Free Bits, IST-Winner, IST-WIP, IST-Coopcom, ICT-Exalted, ICT-Emphatic, and MIMOSat. He has published over 80 international journal and conference papers, and holds over 10 patents. Christian received degrees in electrical engineering from Universitat Politècnica de Catalunya, Spain, and Politecnico di Torino, Italy, in 1999, and a Ph. D. degree in electrical engineering from the New Jersey Institute of Technology, USA, in 2003.

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IMDEA Networks Institute is a **research organization on computer and communication networks** whose multinational team is engaged in cutting-edge fundamental science and technology. As a growing, English-speaking institute located in Madrid, Spain, IMDEA Networks offers a unique opportunity for pioneering scientists to develop their ideas. IMDEA Networks has established itself internationally at the forefront in the **development of future network principles and technologies**. Our **team** of highly-reputed researchers is designing and creating today the networks of tomorrow.

***Some keywords that define us:** 5G, Big Data, blockchains and distributed ledgers, cloud computing, content-delivery networks, data analytics, energy-efficient networks, fog and edge computing, indoor positioning, Internet of Things (IoT), machine learning, millimeter-wave communication, mobile computing, network economics, network measurements, network security, networked systems, network protocols and algorithms, network virtualization (software defined networks - SDN and network function virtualization - NFV), privacy, social networks, underwater networks, vehicular networks, wireless networks and more...*

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