TALK

<u>Topic:</u>	Microfluid and M2M Communications
<u>Presenter:</u>	Dr. Andrea Biral
<u>Date:</u>	Monday, April 24, 2017 at 13:30
<u>Location:</u>	Science Park 1, MT 327

<u>Abstract:</u>

The talk is divided into two parts which focus on two different, yet appealing, recent networking paradigms: microfluidic networking and Machine to Machine (M2M) communications. The first part shows the feasibility of introducing routing mechanism into microfluidic systems, where the transmission medium are hydraulic channels and packets are dropets of biological samples. Some simple mathematical models are defined, which capture the macroscopic behavior of droplets in microfluidic networks. Then, these laws are used to describe the simulator that we implemented, which is able to reproduce the motion and predict the path of droplets in a generic microfluidic system. Finally, we validate the simulator and apply it to design a network with bus topology. The research activity on Machine to Machine communication, instead, is aimed at the investigation of a critical issue that is expected to affect Machine-Type Communication (MTC), i.e. energy efficiency. In this respect, we address the problem of delivering a fixed data payload over a Rayleigh fading wireless channel with the purpose of minimizing the average total energy cost, given by the sum of the transmit energy and an overhead circuit energy. This scenario is well suited for uplink cellular MTC in future 5G Internet of Things (IoT) use cases, where the focus is more on device energy efficiency than on throughput. We describe the optimal transmission policies to be used under various coordinated access scenarios with different levels of channel state information and show the corresponding theoretical bounds.

<u>Short resume:</u>

Andrea Biral (IEEE S'15) received the M.Sc. degree in Telecommunication Engineering and the Ph.D. in Information Engineering from the University of Padova, Italy, in 2012 and 2017, respectively. From February 2012 to August 2013, he worked in Telecom Italia S.p.A. as Network Planning Engineer. In 2015, he spent 5 months as an intern at Alcatel-Lucent Bell Labs in Murray Hill, New Jersey, USA under the supervision of Howard Huang, Head of the Wireless Technologies for the Internet of Things group. His research interests include microfluidics, machine to machine (M2M) communications, and localization.