ONFIRE Consortium Symposium – (Auditorium - B4) Tuesday 29h January 2018 , Castelldefels (Barcelona), Spain	
14:10-14:55	**Invited Speaker 1:** **Ramon Casellas (CTTC)** **Title:** Control of Disaggregated Optical Networks **Abstract:** Traditional optical transport networks are proprietary, integrated and closed, acting as a highly coupled, single vendor managed domain. They can export high-level interfaces and open NBI, yet the internal details and interfaces are hidden from the operator. On the other hand, dis-aggregation involves composing and assembling open, available components, devices and sub-systems (with partial or total dis-aggregation, down to each of the optical components) and is a trend driven by aspects such as the mismatch between the needs of operators and the ability to deliver adapted solutions by vendors; the increase in hardware commoditization; the different rate of innovation for different components; the promised acceleration on the deployment of services and the consequent reduction in operational and capacity expenses. There are opportunities due to the new degree of flexibility, allowing component migration and upgrades without vendor lock-in, yet dis-aggregated optical nodes may not have the same level of integration and performance than those of integrated systems. In any case, from the point of view of control and management, such networks are a clear use case for the use of open interfaces exporting hardware programmability and unified, model driven development. This talk is an introduction to Software Defined Networking (SDN) for dis-aggregated optical networks. In particular, the course will present basic architectures and common trends such as the use of Netconf/Restconf protocols, Model Driven development, and the use of Yang as a unified data modeling language. The Metro-Haul and ODTN projects will be presented as examples combining open source projects (e.g. the ONOS SDN controller) and related initiatives (e.g. OpenROADM)
14:55-15:40	**Invited Speaker 2:** **David Gregoratti (CTTC)** **Title:** Convex optimization for big-data problems: the role of sparsity **Abstract:** (WindMill ITN) The availability of cheap sensing devices and of capacious storing solutions have lead researchers to build gigantic data sets. However, the more is not always the better: finding our way through such a great amount of information may be tough from the point of view of practical algorithms, due to memory and computational requirements. Moreover, interpretability may also become an issue, since intuition is hardly effective when dealing with thousands of parameters. This talk is a brief introduction to convex optimization techniques that promote a sparse representation of large-dimensional problems, meaning that they favor parsimonious solutions that only involve a considerably reduced subset of inputs.

15:40-16:00	**Coffee Break (Hall – B4)**
16:00-16:45	**Invited Speaker 3:** **Paolo Dini (CTTC)** **Title:** Energy Sustainability in Mobile Networks: a Learning Perspective **Abstract:** We are now living the digital era. Dematerialization is becoming a reality, and everybody and everything, including machines, is globally connected through the Internet. The trend is of a further increase in traffic demand, number of offered services and connected devices, especially mobile. However, the massive use of Information and Communication Technologies (ICT) is also increasing the level of energy consumed by that system and its footprint on the environment. In 2030 ICT is expected to consume 51% of the electricity generated and will be responsible of 23% of the carbon footprint by human activity. Sustainable design of ICT, and specially of mobile networks, is, therefore, a key and challenging sector for societal prosperity. In this talk, we will elaborate on the architecture of the future mobile networks (5G) and its interaction with the electricity grid. The integration of the radio access network with a distributed renewable energy system will be discussed, by reporting the main building blocks and methods to achieve the self-sustainability of the integrated system. The focus will be given to the network control architecture and algorithms to ensure efficient deployment and operation of the available spectrum, energy and computational resources. In particular, tools such as Machine Learning (ML) and Dynamic Programming (DP) will be discussed to be incorporated in the control functions of the future RANs to analyze the environment, take the appropriate actions and balance many, often conflicting, goals. In fact, ML and DP may include an end-to-end knowledge of the system to achieve a proactive optimization, able to exploit the huge amount of data available and to even incorporate additional dimensions, such as the characterization of end user experience and behavior, the energy consumed and harvested.
16:45-17:30	**Invited Speaker 4:** **Wolfram Lautenschlaeger (NOKIA Bell Labs)** **Title:** The Optical Ethernet Networking Prototype **Abstract:** Optical Ethernet is a framework for Tbit/s scale metro networks. It is targeting leading edge coherent optical transmission in combination with light-weighted packet add/drop. The architecture involves various newly designed procedures and protocols. For proof of concept, we implemented a prototype network of 6 Optical Ethernet nodes at switching data rates of 10Gbit/s on all interfaces. We verify our assumptions with respect to switching performance, implementation complexity, scalability to large node counts, and completeness and consistence of the design.
17:30-18:15	**Invited Speaker 5:** **Konstantinos Christodoulopoulos (NOKIA Bell Labs)** **Title:** Accurate Quality of Transmission Estimation using Machine Learning

	Abstract: In optical transport networks the Quality of Transmission (QoT) is estimated before provisioning new or upgrading existing connections. Traditionally, a physical layer model (PLM) is used for QoT estimation coupled with high margins, used to account for the uncertainty in the evolving physical layer conditions. Reducing the margins increases network efficiency but requires accurate QoT estimation. We present two machine learning (ML) approaches to formulate an accurate QoT estimator. We gather physical layer feedback, by monitoring the QoT of existing connections, to understand the actual physical conditions of the network. This data is used to train either the input parameters of a PLM or a machine learning model (ML-M). The proposed ML methods account for variations and uncertainties in equipment parameters, such as fiber attenuation, dispersion and nonlinear coefficients, or EDFA amplifier noise figure per span, which are typical in deployed networks.
18:15-18:45	**Visit to the CTTC Labs.**