Ph.D. in Information Technology
Thesis Defense

February 11th, 2022
at 10:30
Room 20.s.1 and online by Webex

Andrea PIMPINELLA – XXXIV Cycle

Machine Learning based Management and Monitoring of Next Generation Communication Networks

Supervisor: Prof. **Alessandro Redondi**

Abstract:

Communication networks are witnessing an unprecedented growth in the number of connected devices, which will determine a dramatic increase of traffic demand. Concurrently, the evolution of 5G technology as well as the raise of non-legacy networking paradigms (e.g., M2M communications, industrial IoT, etc.) are introducing a huge variety of new, vertical services and applications, which will further increase the pressure on today's networking infrastructures.
This scenario calls network operators for continuously investing in all network domains to meet services requirements and customer expectations. However, a major issue is that traditional approaches to network deployment, design, and management are rapidly becoming inadequate to handle such increase of complexity.
In this vein, my PhD work fosters the development of networking strategies to enable intelligent, Quality-of-Service (QoS) and Quality-of-Experience (QoE) oriented network behaviors and explores the potentialities of Artificial Intelligence (AI) to serve as game-changing technology for the design of flexible, dynamic and proactive communication networks. Focusing on Machine Learning (ML) as the most popular approach to AI, I evaluate the impact of data-driven approaches to network monitoring, resources management and service-oriented infrastructure dimensioning with respect to mobile, fixed and sensors networks. Results confirm the benefit that intelligence can have on network services performance as well as on the efficiency of network management and monitoring processes, and provide operators with generalisable guidelines about the adoption of intelligence-based networking strategies.

PhD Committee
Prof. **Matteo Cesana**, Politecnico di Milano
Prof. **Marco Fiore**, IMDEA, Madrid
Prof. **Micheal Seufert**, Universität Würzburg