

**Invited Talk Abstract**

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# Evolution of Network Intelligence: From Classical Optimization to AI Agents

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<b>Date</b>	July 27, 2026
<b>Time</b>	14:30–15:00
<b>Session</b>	Session 2
<b>Venue</b>	Department of Mathematics, National Taiwan Normal University, Taipei, Taiwan

## Abstract

Traditional model-based optimization has long been the foundation for resource allocation in wireless networks. However, as future network systems become increasingly complex, we need new approaches to handle highly dynamic and non-stationary environments. This talk traces the evolution of network intelligence through three main stages. The first stage focuses on system perception and prediction using hybrid convolutional and recurrent neural networks. The second stage discusses dynamic decision-making and control. We show how deep reinforcement learning and multi-agent algorithms can be deployed to efficiently solve resource allocation problems that are often too complex for traditional solvers. The third stage explores the concept of generalization, introducing how foundation model based agentic architectures can be used to manage and execute complex networking tasks. Together, these developments show how network intelligence is shifting from classical optimization to cognitive agents, and we will conclude by discussing the open challenges for applied optimization in the AI era.