

# Hierarchical decision model for throughput maximization in D2D-enabled LTE-Wi-Fi HetNets

Abiodun Gbenga-Ilori<sup>1</sup> Aydin Sezgin<sup>2</sup>

<sup>1</sup>Department of Electrical and Electronics, Engineering, University of Lagos, Lagos, Nigeria

<sup>2</sup>Institute of Digital Communication, Systems, Ruhr-Universität Bochum, Bochum, Germany

## **Abstract**

This paper proposes a hierarchical decision model for efficient and fair coexistence of Wireless Fidelity (Wi-Fi) and heterogeneous cellular networks with device-to-device (D2D) communications. The first sub model is an allocation game formulated to model the data rate gain possible through the deployment of D2D communication in cellular networks. This is to guarantee that the Long-Term Evolution (LTE) network is optimally utilized before offloading traffic to Wi-Fi small cells. The second sub model is a Markovian model proposed as an optimal spectrum sharing scheme that guarantees efficient spectrum utilization and interference reduction in LTE-Wi-Fi heterogeneous networks (HetNets). Simulation results verify that the proposed decision model not only provides a more spectrum efficient sharing scheme but also shows better network throughput while ensuring fairness in spectrum access for Wi-Fi users.