University of Cyprus
Department of Electrical and Computer Engineering

Seminar Series: Fall 2023/24

Large-scale Heterogeneous Ultra-dense LEO Satellite-based Cellular Networks

IRIDA Research Centre for Communication Technologies

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Tuesday, 31 of October 2023, 16:00-17:00

Room: LRC 012

Abstract: Owing to the growing demand for ubiquitous connectivity, low earth orbit (LEO) satellite-based communication networks are envisioned as a key-enabling technology for the next-generation networks. However, the existing literature disregards the heterogeneous nature of the real-world LEO satellite networks. Motivated by this, in this work, an analytical framework based on stochastic geometry is developed, aiming to assess the downlink coverage performance of the large-scale heterogeneous LEO satellite-based communication networks. Based on the proposed mathematical framework, we derive the analytical expressions for the coverage probability, by taking into account the existence of inter-cell interference. Our results show that the inter-cell interference and fading channels jeopardize the coverage performance. Moreover, increasing the transmit power can improve the coverage probability at the low signal-to-noise ratio regime. Finally, we demonstrate that a higher coverage probability is achieved by narrowing the beam and/or by lowering the altitude of the LEO satellites.

Biography: Yuan Guo received the B.Sc. degree in Communication Engineering from Beijing Jiaotong University (BJTU) in 2018, and the MSc in Wireless and Optical Communications from University College London (UCL) in 2019. He is currently a Ph.D. student at the Department of Electrical and Computer Engineering of the University of Cyprus and a researcher at the IRIDA Research Centre for Communication Technologies. Since September 2019, he has been an Early Stage Researcher of the European ITN project PAINLESS. His research interests focus on the field of wireless communications, simultaneous wireless information and power transfer technologies, satellite communications, and the next-generation communication systems.