

Heliostat Consortium Seminar Series

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**Professor Eirini
Tsiropoulou**

Associate Professor,
University of New
Mexico

eirini@unm.edu

Host: Dr. Rebecca
Mitchell

Title: HELIOCOMM: A
Wireless
Communications
Autonomous System
for Concentrated Solar
Power Fields

When: March 20th 1-2
PM MDT

Zoom:
<https://nrel.zoomgov.com/j/1614177829>

Abstract:

This talk introduces HELIOCOMM, a fully autonomous wireless communication system engineered to exemplify resilience and efficiency in Concentrated Solar Power (CSP) fields. HELIOCOMM is based on the principles of the Integrated Access and Backhaul (IAB) technology, entropy-based routing, dynamic spectrum management, and interference mitigation to design and implement a fully autonomous wireless communications system to support the closed-loop autocalibration of the heliostats. The HELIOCOMM's primary objectives include the modular design and fine-tuning of IAB-based networks to optimize energy efficiency and minimize latency, the rigorous testing of IEEE 802.11ax and IEEE 802.15.4 protocols within the IAB paradigm, the dynamic clustering-driven network reconfiguration, the design of real-time entropy-based routing algorithms, as well as the orchestration of dynamic spectrum management mechanisms for both access and wireless backhaul, while introducing intra- and inter-cluster interference mitigation strategies. Preliminary simulation and emulation-based results will be presented demonstrating an achieved communication latency less than 250 msec regarding the communication of each heliostat with the central station in a CSP field consisting of 7800 heliostats.

Bio:

Dr. Eirini Eleni Tsiropoulou is an Associate Professor, Computer Engineering Area Chair, and Director of Recruiting and Admissions at the Department of Electrical and Computer Engineering, University of New Mexico. She graduated with a Ph.D in Electrical and Computer Engineering from National Technical University of Athens in 2014. Her main research interests lie in cyber-physical social systems and wireless heterogeneous networks, with emphasis on network modeling and optimization, resource orchestration in interdependent systems, reinforcement learning, game theory, network economics, and Internet of Things. She has received 5 best paper awards and was selected by the IEEE Communication Society - N2Women - as one of the top ten Rising Stars of 2017 in the communications and networking field. She received the NSF CRII Award in 2019, the Early Career Award from the IEEE Communications Society Internet Technical Committee in 2019, and the Junior Faculty Teaching Excellence Award, School of Engineering, University of New Mexico in 2018.