



# ABDELLAH CHEHRI

Department of Mathematics and  
Computer Science.



Royal Military College of Canada,  
Kingston, ON K7K 7B4 Canada



[https://scholar.google.es/citations  
?hl=en&user=....](https://scholar.google.es/citations?hl=en&user=....)



chehri@rmc.ca



[www.chehri.com](http://www.chehri.com)

## An Introduction to RF-Based Physical-Layer Security for UAVs with AI Enhancements

**ABSTRACT:** The rapid proliferation of Internet of Things (IoT) systems and Unmanned Aerial Vehicle (UAV) platforms has intensified the need for resilient wireless security mechanisms capable of operating in adversarial and resource-constrained environments. Ensuring the integrity and authenticity of wireless communications is now a critical requirement for national defense, mission assurance, and the protection of distributed autonomous systems.

Radio Frequency Fingerprinting (RFF) has emerged as a promising physical-layer security technique that leverages hardware-specific impairments embedded in transmitted waveforms to uniquely identify devices. By exploiting these intrinsic signal features, RFF provides a lightweight authentication mechanism that complements or, in constrained scenarios, substitutes traditional cryptographic protocols.

This seminar will highlight how deep learning and adaptive signal-processing methods can reinforce OSI-layer-free security models by enabling device authentication directly at the physical layer, independent of higher-layer cryptographic stacks. Particular attention will be given to the challenges of channel variability, environmental distortions, and cross-transmission generalization, as well as the role of AI in enhancing robustness, scalability, and real-time decision-making in contested wireless environments.

The presentation will examine the strategic implications of these techniques for secure, mission-critical wireless networks and outline future directions for real-world deployment within next-generation defense communication architectures.

**SHORT BIO:** Abdellah Chehri (Senior Member, IEEE) is a Full Professor in the Department of Mathematics and Computer Science at the Royal Military College of Canada (RMC) in Kingston, Ontario, and serves as the Associate Vice-Principal (Research). He also holds appointments as an Affiliate Professor at the Université du Québec (UQO and UQAC) and as an Adjunct Professor at the University of Ottawa. Dr. Chehri is recognized for his contributions to public safety technologies, intelligent mobility and transportation systems, vehicular and wireless communications, smart infrastructures, sustainable IoT architectures, and AI-driven frameworks for connected environments. His research emphasizes V2X communications, 5G/6G connectivity, and federated learning frameworks, advancing innovation in public safety, energy efficiency, and intelligent connectivity. He plays an active role in the IEEE Public Safety Technology (PST) Initiative, serving as Co-Chair of the Transportation Committee, and is a dedicated member of the IEEE Communications Society (ComSoc), the IEEE Vehicular Technology Society (VTS), and the IEEE Photonics Society.

**LANGUAGE:** English