INHA Invited Lecture/Seminar
(IEEE AESS Distinguished Lecture)

IEEE Aerospace and Electronic Systems Society

Cognitive RF Systems: Using AI to Solve Complex Problems

by Dr. Karen Haigh

Date/Time (Fri) 17 Oct. 2025, 15:00~16:00

Place INHA University, Incheon, South Korea
High Tech Center #210

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ABSTRACT

This presentation will introduce a broad overview of how artificial intelligence (AI) can be used in complex radio frequency systems. AI enables RF systems to respond more quickly and effectively to dynamic environment conditions with complex and novel emitters. I will illustrate where the AI techniques of situation assessment, decision making, and machine learning can function in an RF system, and show how Cognitive Radio, Cognitive Radar and Cognitive Electronic Warfare are the same concept. I will describe how to handle real-time in-mission learning, motivate why this capability is crucial, and present ideas on how to evaluate a system that learns during a mission. The presentation is based on the book "Cognitive Electronic Warfare: An Artificial Intelligence Approach"

Dr. Karen Haigh is an expert and consultant in Cognitive EW and embedded AI. Her focus is on physical systems with limited communications and limited computation resources that must perform under fast hard- real-time requirements. In September 2021, her book "Cognitive Electronic Warfare: An Artificial Intelligence Approach", was released by Artech House. She received her Ph.D. in from Carnegie Mellon University in Computer Science with a focus on AI and Robotics. Dr. Haigh is a Fellow of the IEEE for contributions to closed-loop control of embedded systems, and a Fellow of AAIA for outstanding achievements in the area of smart homes.