WORKSHOP
Revolutionizing RF/mmWave Design Automation Through Development and Application of AI/ML Tools

2023 ERI SUMMIT

PROGRAM MANAGER(S): Dr. Tom Kazior and Dr. Sung-Kyu Lim / MTO

DATE: Thursday, August 24, 2023	**TIME:** 8:30am-3:30pm
ROOM NAME: Elwha A – 5th Floor	

DESCRIPTION

AI/ML enhanced design techniqes have the potential to: (A) Enable rapid and accurate design of RF/mmWave systems based on top-level system specifications; and (B) become an enabling force multiplier for the design of all advanced electronic systems (RF, analog, high speed digital, etc.). The current practice is limited to manual, labor intensive, bottom-up approaches. Today, the trade-off spaces in designs are tied to the designer pre-selected topologies, based on human/designer intuition. The novelty of the envisioned approach is to: (1) Open up new design spaces that are outside of human intuition, leading to revolutionary performance; (2) Allow rapid synthesis, saving labor and time; and (3) Achieve rapid portability of designs across technology PDKs. Recent results have indicated the feasibility of this approach. For example, deep learning techniques can be used to model complex electromagneitc (EM) structures, eliminating time consuming EM synthesis and optimization, allowing rapid co-design with circuits. Reinforcement learning has been leveraged for rapid design and layout of analog and mixed-signal blocks. The goal of the workshop is to bring together the leading experts in the two areas of circuit design and AI/ML, share key research results, identify potential benefits of AI/ML enhanced techniques for RF design (some sort of productivity metric or accuracy or increase in probability of first pass design success), identify technology gaps and new research directions and approaches, and inspire cross-disciplinary discussion, learning, and collaboration.

AGENDA

08:30am-08:45am	Opening Remarks: Welcome, vision, and expectations **Tom Kazior and Sung-Kyu Lim / PMs / DARPA MTO**
08:45am-09:10am	Advances in AI/ML design of mmWave passives and circuits **Kaushik Sengupta / Associate Professor / Princeton University**
09:10am-09:30am	What can we learn from applying AI/ML techniques to analog/MS design? **David Pan / Professor / University of Texas at Austin**
09:30am-09:45am	A commercial perspective on AI/ML **Michael Thompson / Cadence**
Morning Break: 9:45am-10:15am	
10:15am-10:30am	A commercial perspective on AI/ML **Jian Yang / Synopsys**
10:30am-11:30am	Breakout session #1
Lunch Break: 11:30am-12:30pm	
12:30pm-01:45pm	Breakout session #2
Afternoon Break: 1:45pm-2:15pm	
02:15pm-03:15pm	Working group outbriefs **One delegate from each group (Passives, Transistors, Circuits, Integration), 15 min.**
03:15pm-03:30pm	Open discussion
Workshops Conclude at 3:30pm	