Rajun Cajun SoC Design: From Algorithmic Intelligence to Hyper-embedded Computing

Abstract: The talk will introduce the audience to all the ongoing research activities related to SoC design at our School. First, the talk will focus on the revived area of embedded computing with the applications of resource-constraint SoCs. The talk will introduce a novel strategy: embedding a small open source, multitasking, real-time operating system, called TurbOS, directly into an SoC IP block to support multiple processes while minimizing code space. Next, the talk will introduce the challenges with running advanced data analytics and machine learning tasks on edge devices. To overcome all the constraints typically encountered in edge environments and to achieve greater reductions in memory footprint and computational overhead, beyond what incremental compression of deep networks can deliver, one can take a significant advantage from emerging paradigms such as Hyperdimensional Computing (HDC). Finally, the talk will conclude with the work that explores the application of Quantum-Inspired Evolutionary Programming (QIEP) across multiple levels of the quantum computing stack, targeting both classical and quantum domains.

Short Bio: Since August 2021 I have been the Director of School of Computing and Informatics at the University of Louisiana at Lafayette. Previously, from September 2011 to July 2021 I was Full Professor and Chair of the Electrical and Computer Engineering Department, University of Massachusetts Lowell and a Co-Director of the Center for Smart Cyber-Physical Systems (SCyPS). I received my PhD degree in Electrical and Computer Engineering from the University of Alberta, Canada in the Spring of 1998. I serve on executive committees and boards of various divisions of ASEE. I am a senior member of ACM, IEEE, and SPIE with 85+ journal and 200+ peer reviewed conference publications (as of 04/2024) in the areas of High-Performance Sustainable Computing Architectures.