IEEE Miami Section Seminar Announcement

Distinguished Lecturer

"AI Accelerators, Chiplet Paradigm, and Cryogenic CMOS for Future Scaled Quantum Computing Systems"

Friday, Mar 07, 2025 | 11:00 AM to 12:30 PM EST
Location: EC 2330, 10555 W Flagler St, Miami, FL 33174
Zoom - Meeting ID: 412 511 0852| Passcode: H2tGgg

Dr. Daniel Friedman,
Distinguished Research Scientist/Senior Manager,
IBM Research center

Summary: **The growth in the application of machine learning and artificial intelligence technology to problems across virtually all spheres of endeavor has been and is expected to remain extraordinary. Hardware acceleration for machine learning tasks is a critical vector that has enabled this exceptionally rapid growth. The emerging chiplet paradigm will drive not only the scaling of compute density in AI solutions, but also promises to enable a proliferation of customized AI solutions for a range of workloads. Also, quantum computing represents a new paradigm that has the potential to transform problems that are computationally intractable today into solvable problems in the future. Significant advances in the last decade have lent support to the idea that quantum computers can be implemented, and further that the goal of demonstrating true performance advantages over traditional computing techniques on one or more problems may be achieved in the not so distant future. Delivering on this promise is expected to require quantum error correction solutions, in turn demanding large qubit counts that pose significant challenges for quantum computer implementations, especially in the area of qubit interface electronics.**

In the first part of the presentation, we will describe example AI accelerator designs in the context of a solution framework, how communication advances are linked AI accelerator advancement, and will discuss approaches to accelerate the emergence of a chiplet ecosystem, including how this emergence might drive new accelerator implementation opportunities.

In the second part of the presentation, we will present a superconducting qubit-based quantum computing system framework, opportunities for cryogenic CMOS introduction into future systems, example cryogenic CMOS implementations and results, and next challenges that must be met to enable cryogenic CMOS adoption.

Speaker Bio: **Dr. Daniel Friedman, a Distinguished Research Scientist and Senior Manager at IBM Thomas J. Watson Research Center, is an IEEE Fellow with a doctorate from Harvard University, followed by post-doctoral work at Harvard and consulting at MIT Lincoln Laboratory. At IBM, he initially worked on field-powered RFID tags before transitioning to high-speed wireline and wireless communication, with current research focusing on AI accelerator designs, high-speed I/O, and circuit/system innovations for new computing paradigms, including cryogenic electronics for quantum computing. He holds over 90 patents and has co-authored more than 85 publications, receiving multiple awards, including the Beatrice Winner Award (2009 ISSCC), two JSSC Best Paper Awards (2011, 2019), and the 2017 ISSCC Lewis Winner Outstanding Paper Award. Dr. Friedman has served on key IEEE committees, including ISSCC and JSSC, and is currently the Vice President of the IEEE Solid-State Circuits Society.**

For more information, please contact:
Mr. Mahabaduge Michael Fernando, Web Master, SSCS Chapter, mfern775@fiu.edu
Mr. Sanjay Dadadahalli Prasanna, Web Master, IEEE Miami Section, sdada004@fiu.edu