

## Integrated Systems

**Toward Tbps Optical and Wireline Communication: a  
Circuit Design Perspective****Dr. Bahar Jalali-Farahani**

Technical Lead, Cisco

Date: Friday, November 11<sup>th</sup>, 2022 - Time: 2:00pm -Location: EEB 132Zoom Link/Code: [Meeting ID: 953 8178 5880, Passcode: 566819](#)

Refreshments will be served

**Abstract:** The demand for higher data rate communication has never been greater than today. Driven by emerging technologies particularly IoT and cloud computing, higher capacity is required both in core networking as well as computing applications. A report by the IEEE Ethernet Bandwidth Assessment ad hoc group stated that “global demand for network bandwidth is growing at such an alarming rate that terabit-speed networks will be the only way to support capacity, should current trends continue through 2015”. This brings new challenges for circuit designer community as higher speed and better energy efficiency are expected from building blocks of such communication systems.

This talk starts with an introduction to the two major category of optical communication; IMDD (Intensity Modulated Direct Detect) vs Coherent detection. Pros, cons, and application of each are discussed and the general architecture of receivers and transmitters in these systems are given. The talk then reviews the latest trends in the design of high-speed transimpedance amplifiers and modulator drivers. Some examples of co-design and co-optimization with optics are presented.

**Biography:**

**Bahar Jalali-Farahani** received her PhD in electrical engineering from The Ohio State University in 2005. During her PhD program, she was working with the data converter research group at Freescale Semiconductor in Tempe, AZ where she was responsible for developing digital calibration techniques for high resolution data converters. She joined the department of electrical engineering at Arizona State University in January 2006 and continued her research on digitally assisted high performance analog circuits, and low-power circuit techniques. From 2011 to 2014 she was with Cisco Systems working on design of high-speed components for Silicon-Photonics-based 100Gb Ethernet. In 2014 she joined Nokia Bell Labs in NJ where she was a major contributor to the development of Nokia’s Wavence products, multi-standard microwave links used for long haul and short haul applications. Since September 2017 She has been with Acacia Communications (now part of Cisco) working on millimeter-wave front ends for Silicon-Photonics coherent receivers.

Hosted by Prof. Hossein Hashemi, Prof. Mike Chen and Prof. Constantine Sideris

Organized and hosted by Vinay Chenna ([vchenna@usc.edu](mailto:vchenna@usc.edu)).