

In-Package Optical I/O: Solving the Electrical I/O Bottleneck

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Abstract – Driven by relentless increases in high-performance ASICs (switches, GPUs, CPUs, DRAM, etc.), the electrical I/O roadmap is nearing its end, and the ASIC industry is looking for a ubiquitous replacement to electrical I/O escaping chip packages. To meet such demands, a photonics technology with massive bandwidth density, high energy efficiency, and low cost must be used. These requirements necessitate unprecedented levels of integration between electronics and photonics and require rethinking traditional communication architectures. In this talk, I will present the performance requirements necessary for optical I/O to address the electrical I/O bandwidth bottleneck and review the remaining challenges and opportunities.

Bio – Mark is the President and Chief Scientist at Ayar Labs. He received his Ph.D. from University of Colorado Boulder in 2015. During his Ph.D., he was an NSF Graduate Research Fellow, a Visiting Researcher at MIT, and won the 2015 College of Engineering and Applied Sciences Best Dissertation Award. In 2015, he was on the team that won the MIT Clean Energy Prize Grand Prize. In 2018, he received the PIC Conference Award for Advances in Photonics Integration for the work he and his team achieved at Ayar Labs. He is an author/co-author on over 50 peer-reviewed publications.