2nd North American Workshop on Silicon Photonics for High Performance Computing
May 29 – 30, 2019; Estes Park (Rocky Mountains), CO

From inverse design to implementation of practical photonics

Jinhie Skarda
Stanford University Electrical Engineering
jskarda@stanford.edu

Abstract

Photonic devices that are compact, highly-efficient, and robust are essential for developing practical integrated photonic systems like optical interconnects. It is, however, difficult to design such devices when working with the limited parameter space afforded by the conventional analytic and brute-force photonic design. Instead, we are able to find novel device designs closer to such targets by using physics-based optimization to tractably explore the full design space.

Our photonics inverse-design method (SPINS[1]: Stanford Photonics INverse design Software) offers a powerful tool to design practical photonic devices that are compact, efficient, and robust to large fabrication errors and environmental effects. The approach also produces devices compatible with foundry-based fabrication. We experimentally demonstrate this with a number of examples in silicon photonics, including a variety of couplers, mode splitters and converters, and isolators.

[1]Inverse design software for nanophotonic structures - spins. URL http://techfinder.stanford.edu/technologies/S18-012_inverse-design-software-for.

Bio

Jinhie Skarda is a PhD candidate in the Electrical Engineering department at Stanford University working in Professor Jelena Vuckovic's group. She obtained her B.S. in 2017 from Stanford in Engineering Physics with a concentration in Computational Science. Her research interests include developing computational design methods and designing novel structures for use in optical computation, signal processing, and communication.