**Project Summary – Silicon Photonics Neural Network**

Neural networks (NNs) have recently become popular in Computer Aided Design (CAD) as they can offer quick, inexpensive, and accurate simulation performance compared to traditional numerical techniques. Neural networks can simulate these devices because they are capable of learning non-linear relationships between device features. One specific area in CAD is the design of silicon-photonic devices. The design of silicon-photonic devices requires finite-difference time-domain (FDTD) optical simulations. FDTD simulations can be very time-consuming and demand high performance hardware to run. **In this project, we intend to design a neural network to simulate silicon-photonic devices.**

In order to develop a robust NN, we will have to simulate various silicon-photonic devices using FDTD. For the FDTD simulations, we will be using **Lumerical.**

This project also offers the opportunity to compare different computer hardware for training and inference. In this we can compare how the architectures of CPU’s and GPU’s compare at these tasks. We can also delve into specialized hardware for simulated silicon-photonic devices (Perhaps ASIC chips or FPGAs with our trained NN running on them).