- **Pan Yan**
  - **Title:** Utilizing Nanophotonics for Efficient On-chip Communication
  - **Abstract:** Future many-core processors will require high-performance yet energy-efficient on-chip networks to provide a communication substrate for the increasing number of cores. Recent progress in silicon nanophotonics promises a new signaling technology that provides low latency and high bandwidth density, especially good for global communication as compared to conventional electrical signaling. However, nanophotonics also comes with new trade-offs such as high static power consumption. Thus, new architectural techniques are necessary to fully exploit its benefits.

    In this talk, I will first present our work on a hierarchical, partitioned on-chip network topology called Firefly, where conventional electrical signaling is used for short-range communication, and nanophotonics is adopted only for links in "global" crossbars. Firefly combines the benefits of two signaling technologies, and uses both to their advantages. To further improve the power efficiency, we then focus on the nanophotonic global crossbar design and propose the FlexiShare architecture to maximize the utilization of nanophotonic links through global sharing. FlexiShare avoids resource dedication and enables flexible optical channel provisioning in a crossbar topology.
  - **Bio:** Yan Pan is currently a fourth-year Ph.D student with EECS department of Northwestern University. His research interests include efficient computer architecture for emerging technologies, process variation aware processor design and human-aware computer systems.