

Computer Science Seminar Series

National Capital Region

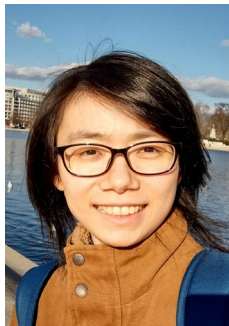
Reliable Operation of Heterogeneous Systems: From Foundation to Practical Fortification

Speaker: Prof. Lishan Yang
George Mason University
Friday, March 29, 2024
11:15AM - 12:15PM, NVC R213

Abstract

Graphics Processing Units (GPUs) are becoming a de facto solution for accelerating a wide range of applications but remain susceptible to transient hardware faults (soft errors) that can easily compromise application output. Reliable operation of systems is crucial, especially for safety-critical applications. Reliability research encompasses two primary aspects: 1) resilience analysis, which aims to understand the impact of faults on the system, and 2) fortification, which focuses on enhancing system reliability. In this talk, I will discuss the challenges and opportunities in resilience analysis and fortification. First, I will present an in-depth characterization study of well-established vulnerability assessment methods for modern GPU architectures, from the microarchitecture all the way to the software layers, and discuss their strengths and drawbacks. Then, I will present a fortification methodology that aims to map threads with the same resilience characteristics to the same warp and perform protection accordingly. Finally, I will discuss some ongoing and future works.

Biography



Lishan Yang is an Assistant Professor in the Computer Science Department at George Mason University. She got her Ph.D. in Computer Science from William & Mary in 2022 and her bachelor's degree in computer science from University of Science and Technology of China (USTC) in 2016. Her research interest falls in system reliability, GPU architecture, and High-Performance Computing.