**Abstract:**

Writing correct and scalable multithreaded programs using shared-memory is hard. Improper synchronization can lead to data races. Data races often indicate the presence of concurrency bugs, and have led to several high profile failures in the past, such as the Therac-25 accident, the 2003 Northeastern blackout, and the 2012 glitch in NASDAQ Facebook share prices. Unfortunately, current shared-memory languages and systems provide weak end-to-end consistency guarantees in the presence of data races. This problem of unsatisfactory semantics for racy executions needs to be resolved, but unfortunately efficient solutions have remained elusive even after years of research.

This talk describes my prior and ongoing research to provide end-to-end memory consistency models for shared-memory languages and systems. I will present a overview of the key challenges in providing strong memory consistency, and will talk about the key insights in my work that show that strong memory consistency in presence of data races is achievable. I will present a software-only technique to provide serializability of synchronization-free regions to all program executions. My proposed approach is the first software-only region conflict detector to provide strong semantic guarantees for racy program executions with under 2X slowdown. My work advances the state of the art in memory consistency by showing that always-on support for strong behavioral guarantees for data races is achievable.

I will also briefly talk about my research on concurrency bugs and approximate computing.

**Bio:**

Swarnendu Biswas is a postdoctoral fellow working with Prof. Keshav Pingali at UT Austin. His current research is on approximate and high-performance computing. He did his PhD with Dr. Michael Bond at The Ohio State University. His graduate research work involved developing dynamic program analyses for detecting and ensuring concurrency correctness properties in multithreaded programs and memory models. His work has been recognized with the ACM SRC Grand Finals 2016 Award, OOPSLA Distinguished Paper Award and OOPSLA Distinguished Artifact Award. Swarnendu received an MS degree from IIT Kharagpur, and did his BE from NIT Durgapur.