

---

THE WEIZMANN INSTITUTE OF SCIENCE  
FACULTY OF MATHEMATICS AND COMPUTER SCIENCE

Faculty Seminar

on Monday, Dec 13, 2021 at 15:40

ff

f

Abstract:

Due to the end of Moore's law, hardware has been developing more rapidly in recent years than it has at any point since the early days of computing. These hardware developments are trending toward multiprocessor settings, which have the potential to deliver the speedups that CPU frequency scaling can no longer support.

In this talk, I will discuss my work on building theoretical foundations for emerging multiprocessor technologies. I will focus on one line of work that concerns a data center communication primitive called Remote Direct Memory Access (RDMA). RDMA allows accessing the memory of a remote machine without involving its CPU, and has become widely adopted in recent years due to its performance advantages. I'll present the first theoretical model that captures RDMA's capabilities, and use it to show that RDMA is more powerful than previous communication technology. I'll then present the design of a state machine replication system based on those theoretical insights that improves previous state-of-the-art latency both in failure-free executions (by over 2x) and in failure recovery (by over 10x).