



- Vijay Nagarajan (<https://users.cs.utah.edu/~vijay/>)
- Professor
- University of Utah

## Research interests:

- Broad: Computer Architecture, Distributed Systems, Programming Languages
- Cache Coherence Protocols
- Consistency Models
- Replication Protocols

## Current Project(s)

- Compound Consistency Models: Compositional approach to memory consistency (with ARM)
- \*Gen: A correct-by-construction approach to coherence protocols (with NVIDIA)
- Exploiting synergies between coherence and replication

## Project Idea(s)...

- Today's processors support heterogeneous shared memory – e.g., GraceHopper (CPU+ GPU)
- But **lack formal foundation** on:
  - specification (het. consistency?)
  - implementation (het coherence?),
  - and **verification** (het. coherence against het consistency.)
- Open problem confronting industry. Proposed specs, shims and verification methodology likely adopted if successful
- Education: Correct-by-construction exemplar: specification, synthesis, verification vertical

## ... and possible collaborators sought

- Formal Methods: Need scalable techniques for verifying safety and liveness
- Complementary interests: correct-by-construction distributed systems (replication protocols, key-value-stores), secure-by-construction systems

