Architecting an Energy-Efficient DRAM System for GPUs

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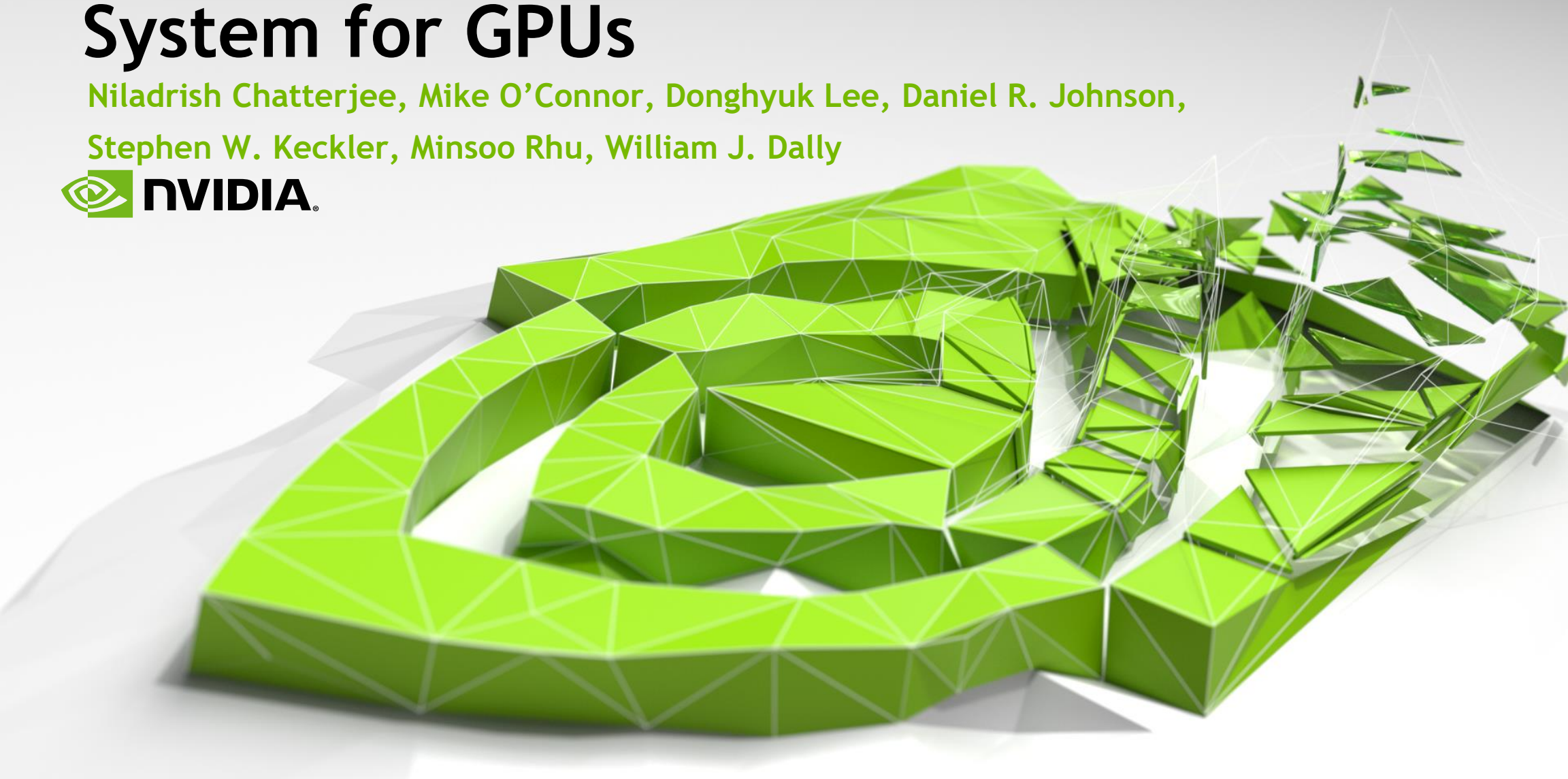


The Problem

GPU DRAMs consume too much energy

- 4TB/s Exascale GPU with HBM2

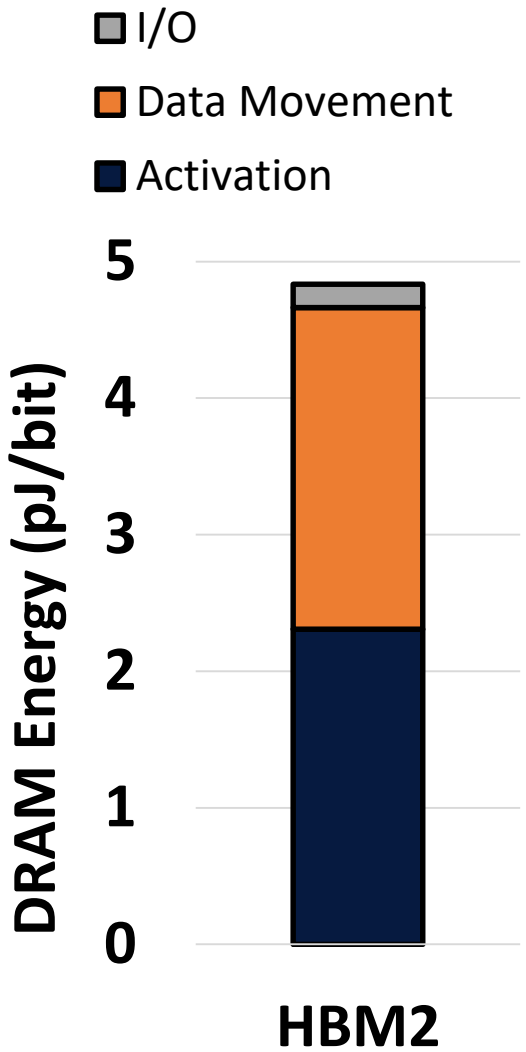
  ➡ **150W for memory !**

- Low row-buffer utilization

  ➡ **high row activation energy**

- Banks with small rows

  ➡ **high area cost**



Solution: Subchannels

Reduced effective row-size

- Memory controller directed activation granularity
- Wide datapath split into parallel narrow subchannels

35% DRAM energy savings

13% GPU performance improvement

2.6% DRAM die-area overhead