GPU COMPUTING OVERVIEW

Nick Becker
Add GPUs: Accelerate Science Applications
RISE OF GPU COMPUTING

SMALL CHANGES, BIG SPEED-UP

Application Code

Compute-Intensive Functions

Use GPU to Parallelize

Rest of Sequential CPU Code

GPU

CPU
ACCELERATED COMPUTING IS GROWING RAPIDLY

- **580 Applications Accelerated**
- **22x GPU Developers**
- **11x CUDA Downloads**
CUDA POWERS ACCELERATED COMPUTING

DL FRAMEWORKS AND HPC APPLICATIONS ACCELERATED

Googlenet Training Performance Vs K80

Over 80x in 3 Years

127 Systems on Top 500

World’s #1 Summit: 144 PF
World’s #2 Sierra: 95 PF
Europe’s #1 Piz Daint: 21 PF
Japan’s #1 ABCI: 20 PF
Industrial #1 ENI: 12 PF

DEFINING THE NEXT GIANT WAVE IN HPC
GRAND CHALLENGES REQUIRE MASSIVE COMPUTING

- REINVENTING THE LI-ION BATTERY
  3M Node Hours | 7 Days on Titan

- CLOUD RESOLVING CLIMATE SIMULATIONS
  100M Node Hours | 840 Days on Piz Daint

- UNDERSTANDING HIV’S STRUCTURE
  10M node Hours | 16 Days on BlueWaters
Parallel Processing Demo