
Supercomputing Conference Education Program

# High Performance Computing in the Core Computer Science Curriculum

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# The Warning

- Nothing earth-shattering will be presented during this talk.
- However, being able to produce students that could actually compute, verify, and validate a simulation of the earth shattering is what my talk is all about.

# The problem:

- Moore's law:
  - 18 month doubling rate
- Wheat's law:
  - 18 year doubling rate
- Gray's conjecture:
  - 18 decades.

# The problem:

- Core Computer Science Curricula
  - Systems
    - Operating Systems
    - Networking
    - Architecture
    - Parallel & Distributed computing
  - Databases
  - Software Engineering
  - Programming Languages
  - Theory of Computation, Graphics, ...

# Self-examination

- Core Computer Science Curricula
  - Systems
    - Operating Systems
      - Stallings
      - Nutt
      - Silberschatz
    - Networking
      - Kurose and Ross
      - Peterson & Davie

- Contrast this with recent efforts in Physics.

# Building the foundation

- SC Education Program
  - Persistent effort to support development of curricular materials based upon HPC technologies showcased at the Supercomputing Conference Technical program and Exhibition floor.

# Deliverables

- BCCD (next generation)
- LittleFe
- Curricular components:
  - Threads w/ OpenMP
  - Threads w/ GPGPU
  - Scheduling w/ Torque/Maui
  - Software Engineering w/ HPC Compilers
  - Software Engineering w/ Distributed Debugging
  - Databases w/ Distributed File systems
  - IPv6 w/ InfiniBand

# Deliverables

- LittleFe
- (An in-depth analysis of LittleFe and curriculum built up for Computer Science based upon SC Education program efforts took place here)

# The downside

- BCCD (next generation)
- LittleFe
- Curricular components:
  - Threads w/ OpenMP Has legs
  - Threads w/ GPGPU "New," so has legs.
  - Scheduling w/ Torque/Maui Unknown
  - Software Engineering w/ HPC Compilers Wrong
  - Software Engineering w/ Distributed Debugging
  - Databases w/ Distributed File systems
  - IPv6 w/ InfiniBand Unknown