

# CSE/ESE 569M Introduction

Note Title 1/13/2009

- Parallel Arch.
- Prog Env.
  - shared memory
  - message passing
- Issues in parallel codes
- Applications

⇒ [www.cse.wnsl.edu/~roger/569m.html](http://www.cse.wnsl.edu/~roger/569m.html)

- CMS
- find Doc file in Intro module
  - find discussion board

grading		approx.
	assignments	20%
	turn in .zip file	
	project	20%
	midterm	30%
	final	30%

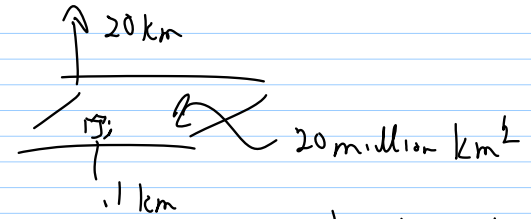
IPDPS.org

need for computing

e.g., weather, atm. modeling

Use cubic grid

- each cube 0.1 km / side
- cover U.S. + Canada  
~ 20 million km<sup>2</sup>
- cover height of 20 km



$$\begin{aligned} \# \text{ of grid pts} &= (2 \cdot 10^7) (20) (10^3) \\ &= 4 \times 10^{11} \end{aligned}$$

$\frac{\text{km}^2}{\text{area}} \quad \frac{\text{km}}{h} \quad \text{cubes/km}^3$

- 100 inst. / grid pt.

$$\Rightarrow 4 \times 10^{11} \times 100 = 4 \times 10^{13} \text{ inst}$$

- want 1 / hr for two days

$$4 \times 10^{13} \times 48 \approx 2 \times 10^{15} \text{ inst}$$

machine 1 gigaflop = 1000 mflops  
=  $10^9$  inst/sec

$$\text{time} \rightarrow \frac{2 \times 10^{15} \text{ inst}}{10^9 \text{ inst/sec}} = 2 \times 10^6 \text{ sec} = 23 \text{ days}$$

1 teraflop =  $10^{12}$  inst/sec

$$\text{time} \rightarrow \frac{2 \times 10^{15} \text{ inst}}{10^{12} \text{ inst/sec}} = 2000 \text{ sec} \approx \frac{1}{2} \text{ hour}$$

cover earth area  $5 \times 10^8 \text{ km}^2$

25x priv. area

time now 13 hours

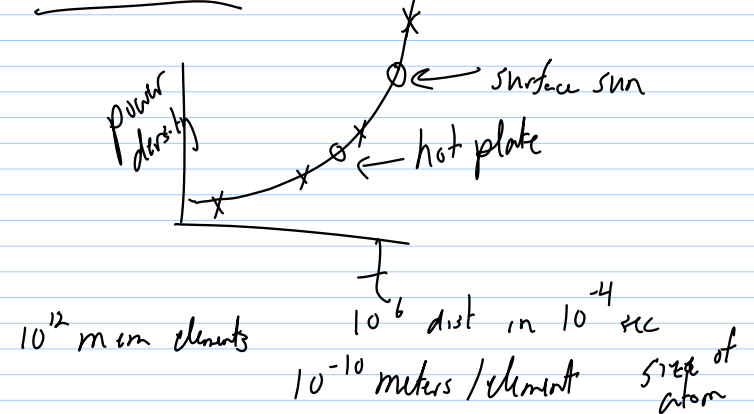
## Grand Challenge Problems

Quantum Chromodynamics      Very Large Discrete-Event Sim

Blood flow in heart

Evolution of galaxies

conventional machines don't work



Class exp. infrastructure

8 proc. (4 dual-core) AMD opterons  
rote. cct. w/usb. eth

Lopata 400      30 machines      quad cores

Sun Grid Engine