February 20, 2015

Morgan State Workshop

Overview of Computational Science Education Materials

XSEDE

Extreme Science and Engineering
Discovery Environment

NSF

Why Computational Science?

- How science and engineering is done
  - Models allow insights when systems are too large, too small, or too complex to fully understand through experimentation
  - Reduces time to solution for many types of research and design
  - Facilitates research that could not be done in any other way
- Now expanding to the use of digital resources in the humanities and social sciences

Computational Science Skills

- Computational science provides skills needed in the present and future workforce
  - Understanding of modeling techniques that are used in research and business
  - Data management skills
  - Analytical skills
  - Teamwork skills
  - Communications skills
- Inquiry-based education approach engages students in learning

Benefits to Students

- Inquiry-based learning is more effective than traditional lecture oriented instruction
  - Students are actively engaged in the learning process
  - Students gain deeper insights and have higher retention rates for the information
  - Facilitates the integration of information across academic disciplines – math, science, engineering, computer science, social science, and humanities

Goals for the Session

- Demonstrate the pedagogy for computational science education
- Progression of possible activities
  - Using complete models to demonstrate principles
  - Running models to gain insights into system behavior
  - Modifying models to relax assumptions
  - Building new models

What We Will Cover

- Introduce materials and models that can be incorporated for classroom use

- Introduce simple tools that can be used to build and demonstrate modeling techniques

- Provide a list of resources you can explore in detail later

Getting Started

- Point your browser here:

- https://www.osc.edu/~sgordon
  - Choose Workshop Materials
  - Then Links to other materials

Our reach will forever

exceed our grasp, but,

in stretching our horizon,

we forever improve our world.

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