Undergraduate Education Program: Pathways to Petascale

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Training vs. Education

- **Training**: How do I use it now? How do I run this code on this machine? How do I use the tools?
- **Education**: When am I going to ever use this? Why would I want to, what would I learn? What are the tools, what can they tell me, why should I care?

- **Goal**: Training AND Education: horizontal (collaboration among like activities) and vertical (collaboration across education levels) integration
Cyber-enabled Computational Thinking

- Computational (Science Education)
- (Computational Science) Education
- REPRESENTATION

- Quantitative Reasoning
- Analogical Thinking
- Multi-scale Modeling
Materials, Student, Faculty Development

- Enable exploration of Computation/Communication “continuum”

\[ \text{TTS} = \frac{f(\text{Work})}{\text{Workers}} + g(\text{Messages}) \times \text{Workers} \]
Undergraduate Petascale Education Program

• Importance of Undergraduate focus
  • Development of next generation graduate students
  • Development of next generation K-12 teachers
  • Development of educated workforce

• UG effort to include 4-year colleges
  • Majority of graduate students
  • Flexibility in interdisciplinary course innovation
  • Increased emphasis on computational science

• UG effort to include 2-year colleges
  • Growing prevalence of transitional students
  • Content courses for many teacher education programs
  • Development of associate degree programs
Undergraduate Education Program (cont’d)

• Outreach and Broadening Participation
  • Underrepresented groups participation promoted in all aspects of undergraduate program
    • Development of curriculum materials
    • Undergraduate internships
    • Faculty workshops
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